

# AUTOMOTIVE INDUSTRIES

A C H I L T O N P U B L I C A T I O N

SEPTEMBER 15, 1960

## Features ●●●

**COMET'S OPTIONAL  
170 CU IN. ENGINE**

**DESIGN FEATURES OF  
CHRYSLER CORP. CARS**

**SOVIET AMPHIBIOUS  
VEHICLES**

**MAKING THE F-85  
AT OLDSMOBILE**

## Studebaker OHV Engine ►

Don Schrum, Body  
Development Engineer  
and M. P. deBlumenthal,  
Chief Development Engineer,  
point to the new  
six-cylinder Lark engine

PAGE 60



**ENGINEERING  
MANAGEMENT • DESIGN • PRODUCTION**

# NEW

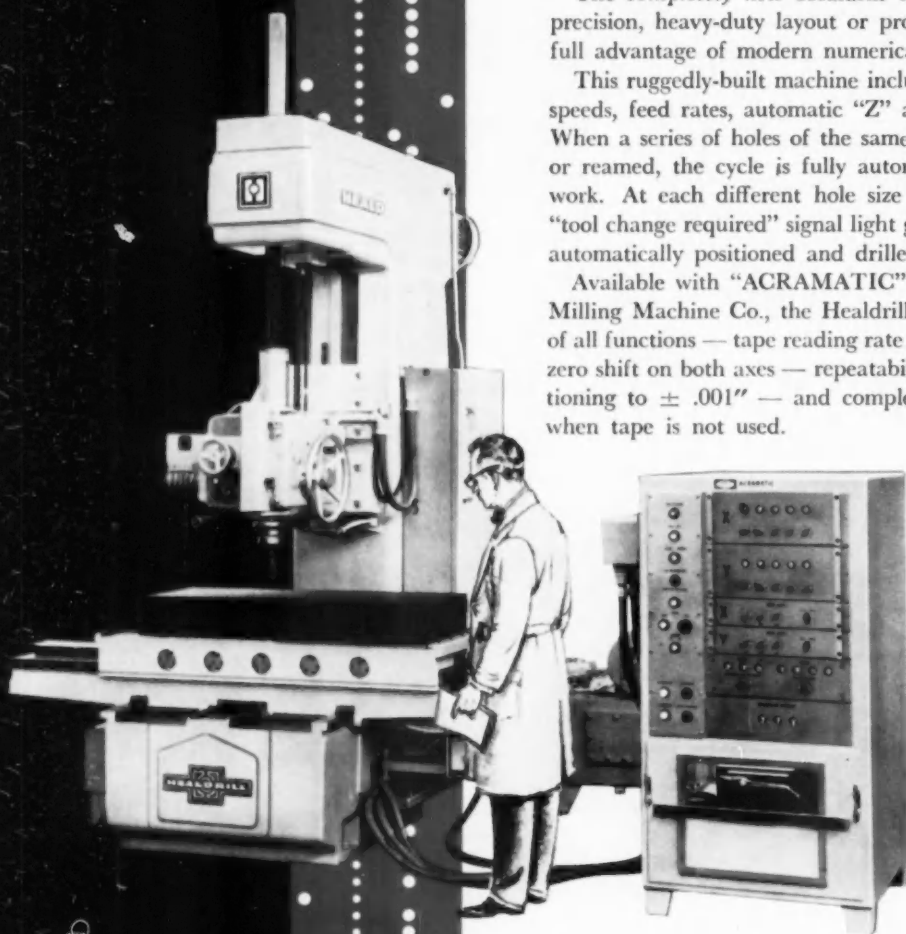
# HEALDRILL

*... a high-precision drilling machine  
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Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

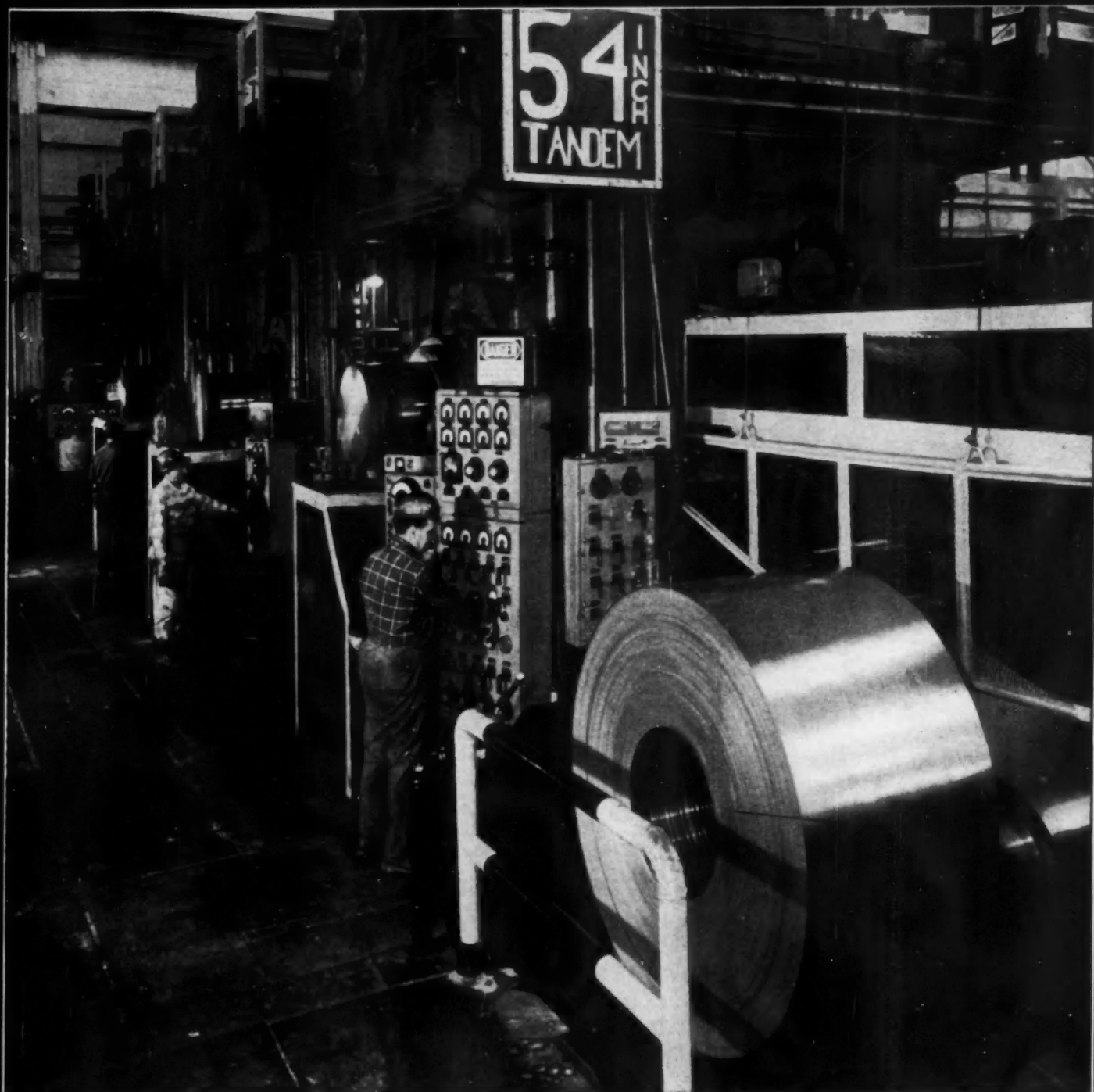


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# AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE • PUBLISHED SEMI-MONTHLY

SEPTEMBER 15, 1960

VOL. 123 No. 6

Passenger Cars • Trucks • Buses • Aircraft • Tractors  
• Engines • Bodies • Trailers • Road Machinery •  
Farm Machinery • Parts and Components • Accessories  
• Production and Processing Equipment •  
Design • Production • Engineering • Management

## Features • • •

### ▼ Mechanical Features of '61 Chrysler Line

A complete round-up of engineering and design features for Chrysler's new family of cars. Page 55

### ▼ New OHV Six for Lark

Studebaker's L-head six is being replaced by an entirely new overhead valve engine. Design features are described. Page 60

### ▼ 1961 Comet Offers 101 hp Engine

The new Comet will have an optional 170 cu in. engine to supplement the standard 144.3 cu in. model. Page 63

### ▼ A Look at Off-Highway Trucks

Manufacturers move close to users in a bid to anticipate design changes and keep market humming. Page 64

### ▼ Leyland's New Heavy-Duty Trucks

An overseas report describes the new line of Leyland high-powered trucks covering three basic models in 15 different cab-over-engine combinations. Page 67

### ▼ Soviet Amphibious Vehicles

The mobility of the Soviet Army has been greatly enhanced by the development of amphibious vehicles. Some of the latest types are described and illustrated. Page 68

### ▼ Caterpillar's New Truck Diesel

The company's first entry into truck market is a 6 cylinder, 4 stroke Diesel with turbocharger and aftercooler as standard equipment. Page 71

### ▼ Inside Oldsmobile

Picture story of production operations on the F-85. Page 72

### ▼ Mechanized Molding at Deere

Deere's Dubuque Tractor Works has in operation a semi-automatic cycle for molding gray iron. Page 74

### ▼ British Hydrostatic Drive

The Dowty hydrostatic transmission for off-highway vehicles provides continuously-variable ratios. Page 75

### ▼ New Dodge Trucks Have Slanted Six

Engineering highlights of the 1961 Dodge truck line are revealed in this article. Page 76

### ▼ Dana Expands Laboratory

Facilities for testing of old and new automotive products have been greatly expanded at the Toledo headquarters of the Dana Corp. Page 94

### ▼ Making Hydraulic Cylinders

Conversion of standard machine tools boosts output of hydraulic cylinders at Allis-Chalmers. Page 98

### ▼ Boat Trailer Has Air-Inflated Rollers

Dana Corp. has a new boat trailer that supports hull on air-inflated rollers. Page 109

### ▼ 33 New Product Items and Other Features Such as:

Machinery News; Manufacturers' News; and Industry Statistics.

... continued on next page

MEMBER



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Business Publications Audit of Circulation

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Newest Bendix mobile brake laboratory tests heavy-duty brakes. Top photo shows Bendix engineer at instrument panel inside mobile lab.

Bendix PRODUCTS DIVISION South Bend, IND.

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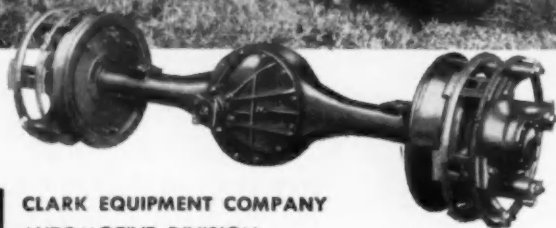
# TORO TURF TRACTORS

## and a 24-year story of trouble-free axle performance

You've probably read a lot about the thousands of *big axles* Clark's Automotive Division makes for off-highway trucks, construction machines, and similar vehicles. Well, Clark makes *small axles* too and sells them to a wide variety of users. We're proud to number among these people some of the biggest names in industry—like Toro Manufacturing Corporation.

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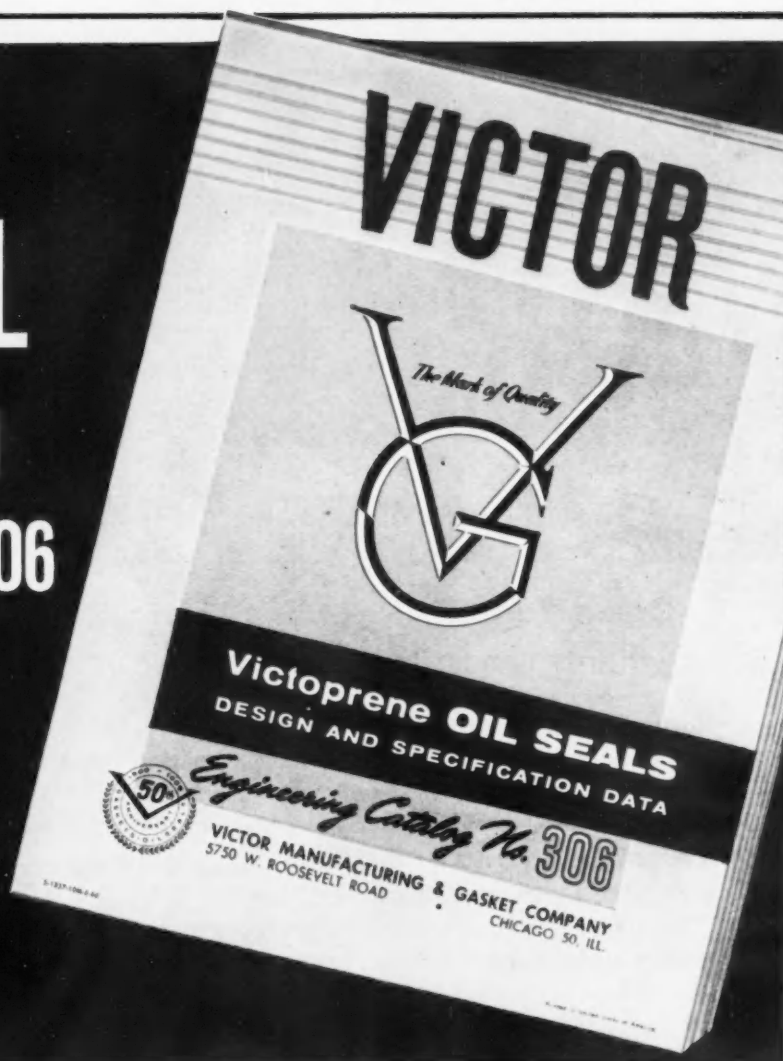
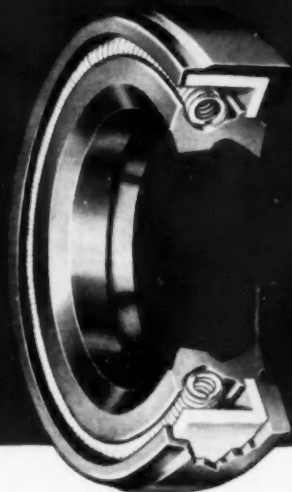
Typical Clark-equipped Toro tractor, this 130 hp Parkmaster has dual drive-wheels for high traction and stability. Unit also features easy-to-reach hydraulic controls for speedy in-seat raising and lowering of each mower. Axle is a Clark Model R-750.

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AUTOMOTIVE DIVISION  
Buchanan 2, Michigan

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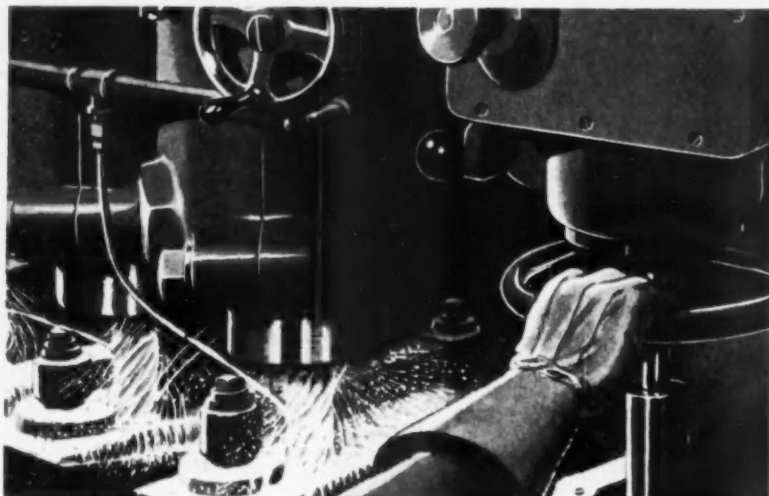
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it PAYS to ask Oakite



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## CALENDAR

OF COMING SHOWS AND MEETINGS

- Steel Founders' Society of America  
Fall Meeting, Hot Springs, Va.  
Sept. 18-20
- AWS National Fall Meeting, Pitts-  
burg ..... Sept. 26-30
- ISA, Fall Instrument-Automation  
Conf. & 15th Annual Meeting,  
NYC ..... Sept. 26-30
- Iron and Steel Exposition, Cleve-  
land ..... Sept. 27
- ASME, Rubber & Plastics Confer.,  
Erie, Pa. .... Oct. 9-12
- SAE, National Aeronautic Meeting,  
Los Angeles ..... Oct. 10-14
- Cast Bronze Bearing Institute, 1960  
Annual Meeting, Asheville, N. C.  
Oct. 12
- IMS, National Industrial Engineer-  
ing and Management Clinic,  
Chicago ..... Oct. 13-14
- National Automobile Show, Detroit,  
Oct. 15
- Magnesium Association Annual  
Convention, Cleveland ..... Oct. 17-18
- Lubrication Conference, ASME-  
ASLE, Boston ..... Oct. 17-19
- 42nd National Metal Exposition and  
Congress, Philadelphia .... Oct. 17-21
- SPI: "Tooling for the Plastics In-  
dustry," New York City ..... Oct. 19
- 1960 Fleet Maintenance Exposition,  
New York City ..... Oct. 24-27
- Technical Meeting and Products  
Show, Spring Mfg. Assoc., Chi-  
cago ..... Oct. 25-27
- 15th Annual Technical Exposition,  
American Society of Body Engi-  
neers, Detroit ..... Oct. 26-28
- Material Handling Institute Show,  
Louisville, Ky. .... Nov. 1-3
- American Institute of Industrial  
Engineers, Annual Regional  
Conference and Convention,  
Boston ..... Nov. 3-4
- The Society of Die Casting Engi-  
neers, Die Casting Exposition  
and Congress, Detroit ..... Nov. 8-11
- ASTME, Western Tool Show, Los  
Angeles ..... Nov. 14-19
- Automotive Electric Association,  
43rd Annual Meeting and 24th  
Annual Mfg.-Dist. Conference,  
Chicago ..... Dec. 2-9
- Industrial Building Exposition and  
Congress, New York ..... Dec. 12-15
- SAE, International Congress and  
Exposition, Chicago .... Jan. 9-13, '61

### AUTOMOTIVE INDUSTRIES . . .

is your News Magazine of  
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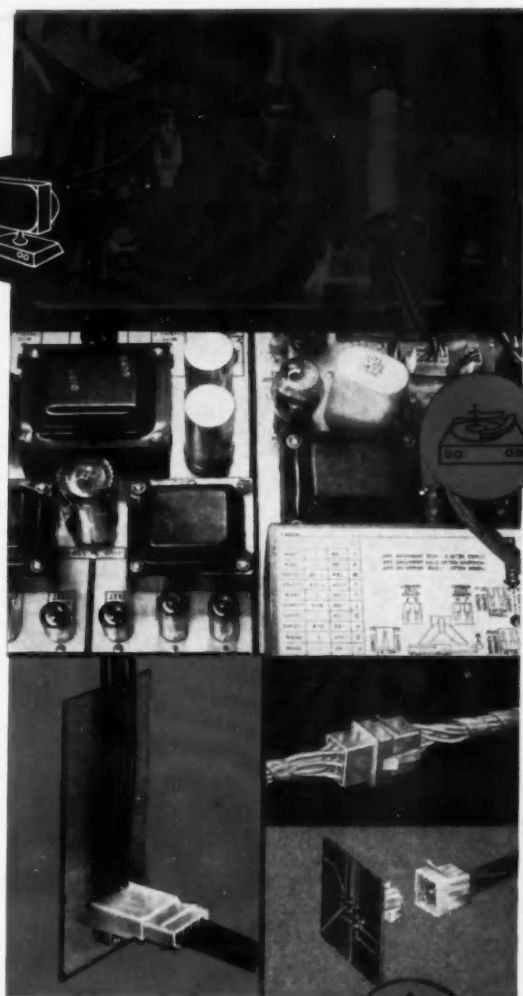
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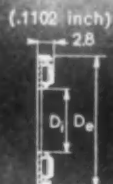
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**Growing Preference at Nation-Wide Fleets Proves**

## **THE TREND IS TO LIPE**



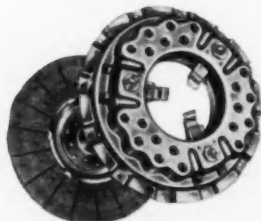
Miller Motor Express of Charlotte, N. C. has installed Lipe Clutches in 40 units. More are in process.

Month by month, year by year, the increasing number and size of orders for Lipe Heavy-Duty DPB Clutches bears out the growing preference of fleet men.

This preference is soundly based on the fleet men's own experience. They try DPB's. They keep performance and maintenance records. They compare. And the results are plain to see:

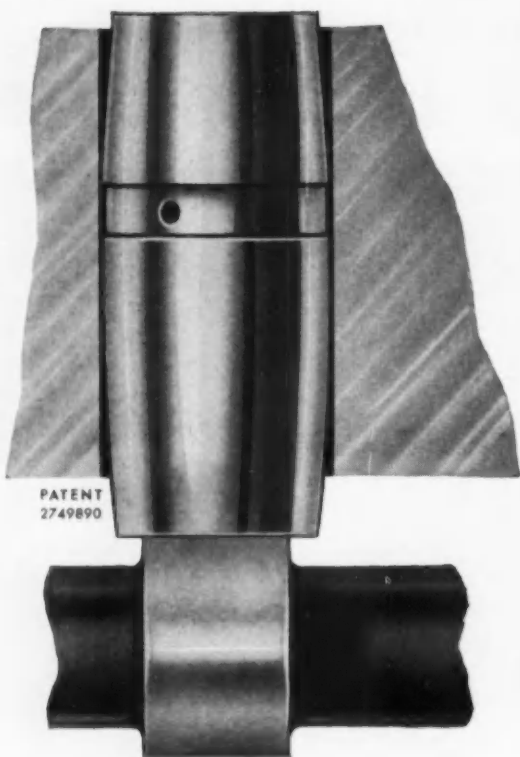
More ton-miles per year . . . more engagements between shop-stops . . . lower cost of maintenance when maintenance is necessary. By any yardstick of costs, these are figures difficult to dispute.

And they all add up to another indisputable fact: *The trend is to LIPE.*



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**Eaton Flat-Face  
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and  
Hydraulic Valve Lifters**

Spherical-face tappets make only limited area contact with the cam. Result: high unit stress, damaging wear, and pitting.

★ ★ ★

Conventional flat-face tappets lower unit stress, but their use has been limited by misalignment and deflection, resulting in edge-riding.

★ ★ ★

Eaton Self-Aligning Flat-Face Tappets permit FULL CONTACT between cam and tappet under all operating conditions.

★ ★ ★

Lower unit stress adds to tappet and hydraulic valve lifter life, and reduces engine maintenance cost.



THE OLD WAY

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longer tappet and valve lifter life,  
call us for a consultation.*

# EATON

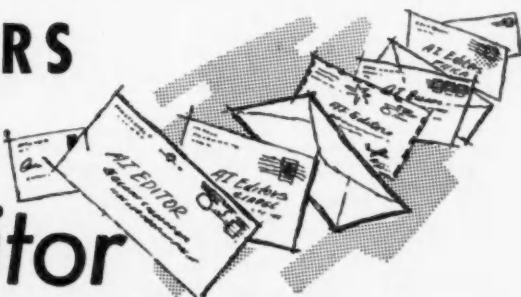
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# LETTERS to the Editor



Readers' opinions or requests for additional information on material appearing in the editorial pages of **AUTOMOTIVE INDUSTRIES** are invited for this column. No unsigned letters will be considered, but names will be withheld on request. Address *Letters to the Editor*, **AUTOMOTIVE INDUSTRIES**, 56th & Chestnut Sts., Philadelphia 39, Pa.

## RADIOISOTOPES

Under separate cover we are sending you a copy of the Instructors Guide for the Radioisotope course just completed as part of our nuclear training studies for the U. S. Atomic Energy Commission. We greatly appreciate your cooperation in connection with these studies.

Howard M. Vollmer  
Head, Personnel Research  
Stanford Research Institute  
Menlo, Calif.

## MACHINE TOOLS

In my opinion you will be doing a great service to the industry by publishing the table of estimates of increased productivity in your September 1 issue. This subject has been something like New England weather, everyone talks about it but nobody does anything about it. You have finally taken the bull by the horns and collected some actual information which every machine tool builder can put to good use in his sales program. I will look forward with interest to the issue.

Joseph T. Vinbury  
Horton, Church & Goff Inc.  
Providence, R. I.

## BUILDING BLOCK MACHINE TOOL

The story which appeared in the August 1 issue of **AUTOMOTIVE INDUSTRIES** concerning our new cylinder head machine line built to "SMTS" standards was very well done and we appreciate your handling of the material.

E. W. Bernitt  
Vice President  
Automotive Operations  
American Motors Corp  
Detroit, Mich.

In my experience as public re-

lations director, I cannot recall when I have seen a more complete, well written and well illustrated article as the one on Buhr Machine Tool in the August 1 issue.

You fellows certainly did a great job in the handling of this story, and all I can say is that we deeply appreciate your efforts on a magnificent piece of reportorial work.

David A. Hallack  
Dir. of Public Relations  
Zimmer, Keller & Calvert  
Detroit, Mich.

## SILICONES

We have been receiving **AUTOMOTIVE INDUSTRIES** for the past years and find it most enjoyable and informative.

In the August 1 issue, we find an article concerning the automotive uses of Silicones. Do you have reprints of this article? We would appreciate receiving several copies for use in our Engineering Department, the subject matter being very timely concerning the many uses of this product.

R. W. Peterman  
Sales Manager  
NOPAK Division  
Galland-Henning Mfg. Co.  
Milwaukee, Wis.

● Reprints will be available in two weeks—Ed.

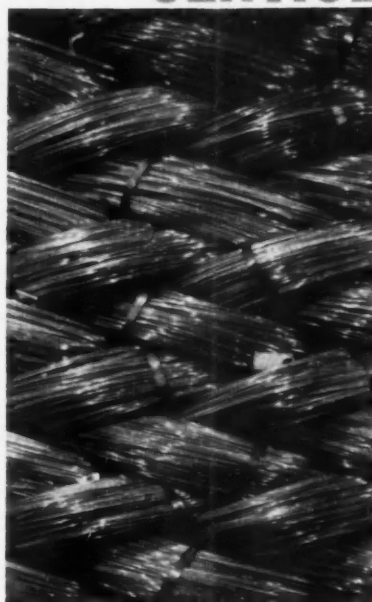
## TEMPERATURE MEASUREMENT

Please advise where we may obtain an article written by E. J. Martin and J. E. Wilson of General Motors, which appeared in **AUTOMOTIVE INDUSTRIES**, June 15, 1954, on "Temperature Recorded During Dynamometer Tests."

R. L. Moore  
Research & Development  
Raybestos-Manhattan, Inc.  
Manheim, Pa.

● You're in luck . . . a tear-sheet is on the way—Ed.

# WIRE FOR SUDDEN SERVICE



## ON SOUTHERN FASTENERS



The wire you see in this photograph will make a multitude of machine screws. This is only a very very small portion of the enormous stock carried in Southern Screw's modern six-acre plant in Statesville, North Carolina. All this stock and all this space means that Southern's manpower, machines and materials are ready to give "sudden service" to your order regardless of its size.

Southern specializes in USA-made fasteners — makes nothing else. This is your guarantee that your fastener problems are Southern's only interest.

If you want sudden service on quality fasteners, plated or plain, Phillips or slotted, standards or specials, get in touch with the Southern Screw distributor, or wire, phone or write to Southern Screw Company, Telephone: Triangle 3-7213, Statesville, N. C.

### WAREHOUSES:

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Machine Screws & Nuts • Tapping Screws • Stove Bolts • Drive Screws • Carriage Bolts • Continuous Threaded Studs • Wood Screws



Circle 112 on Inquiry Card for more data

# A lifetime of light crammed into 15 days



Tung-Sol headlamps are subjected to the severest set of tests in the industry — from raw materials to finished product — before they reach the highways of the world.


One of the most critical final examinations they face is the life test. First, samples of each production run are checked for maximum candle-power, amperage and wattage at design volts. They are then placed in the aging racks and burned at accelerated voltages to assure full completion of their designed life. In this case the low beams of 12 volt headlamps burn continuously at accelerated voltages for fifteen days to make sure they'll produce the 500 hours of peak performance required by S.A.E. specifications.

This test is an example of Tung-Sol's leadership in quality mass production of headlamps . . . leadership which started at the turn of the century when Tung-Sol produced the first successful electric headlamp. Automotive Products Division, Tung-Sol Electric Inc., Newark 4, New Jersey. TWX:NK193.



## TUNG-SOL®

HEADLAMPS • MINIATURE LAMPS • FLASHERS



**KEPS<sup>®</sup>**

**SAVE EXTRA MOTIONS...  
BY THE MILLIONS!**

Eliminate an extra operation, repeated by the millions, by using KEPS, the quality fasteners with the *built-on "lock washer."* KEPS torsion-points grip firm, hold fast, for product dependability and customer satisfaction. A complete line of standard fasteners is available on fast delivery from National Lock ... also, special purpose fasteners engineered to your "specs." Write us.

KEPS, registered trademark  
of Illinois Tool Works

***NATIONAL LOCK***

**FASTENER DIVISION**

• **NATIONAL LOCK COMPANY**

• **ROCKFORD, ILLINOIS**

*another tough problem solved with...*

## REPUBLIC ELECTRUNITE MECHANICAL TUBING

Republic's tube making know-how and fabricating facilities combined to solve a tough problem for the Kuhlman Electric Company, Birmingham, Michigan.

Kuhlman engineers wanted a material to meet the designs of the new Kuhlman "Quick-Grip" H.V. transformer bushing that would reduce radio noise without oil. They preferred the part supplied as a finished product.

A bushing sleeve made of Republic ELECTRUNITE Carbon Steel Mechanical Tubing, 2 $\frac{1}{2}$ " O.D., 10-gage, was the answer. The sleeve is approximately 3" long and has a chamfer on one end. Holes are punched on circumference, and the other end of the tubing is expanded. Coarse threads are cut in the expanded metal on an automatic screw machine.

This is a typical example of the flexibilities in fabrication of ELECTRUNITE. And Republic's Steel and Tubes Division has the facilities, equipment, and "know-how" to fabricate all grades and types of ELECTRUNITE carbon and stainless steel tubing into whatever shapes your product requires.

ELECTRUNITE is available in a wide range of sizes, gages, and wall thicknesses in both carbon and stainless steel. Call your Republic representative. Or, write direct. Use coupon below.

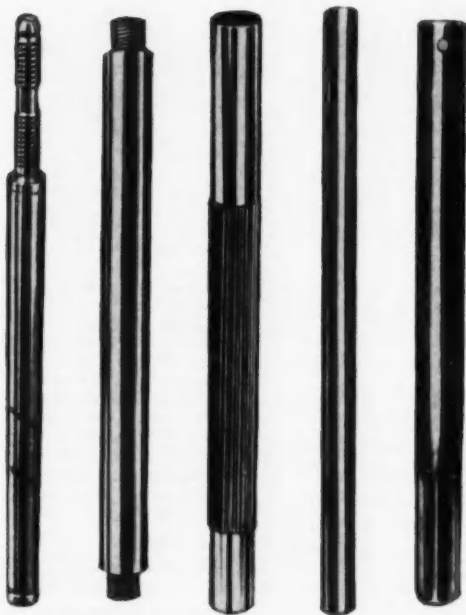


The Kuhlman "Quick Grip" H.V. sleeve, made of Republic ELECTRUNITE Mechanical Tubing, is a feature of the K-E Kuhlman Transformer, engineered and manufactured by the Kuhlman Electric Company, Birmingham, Michigan.



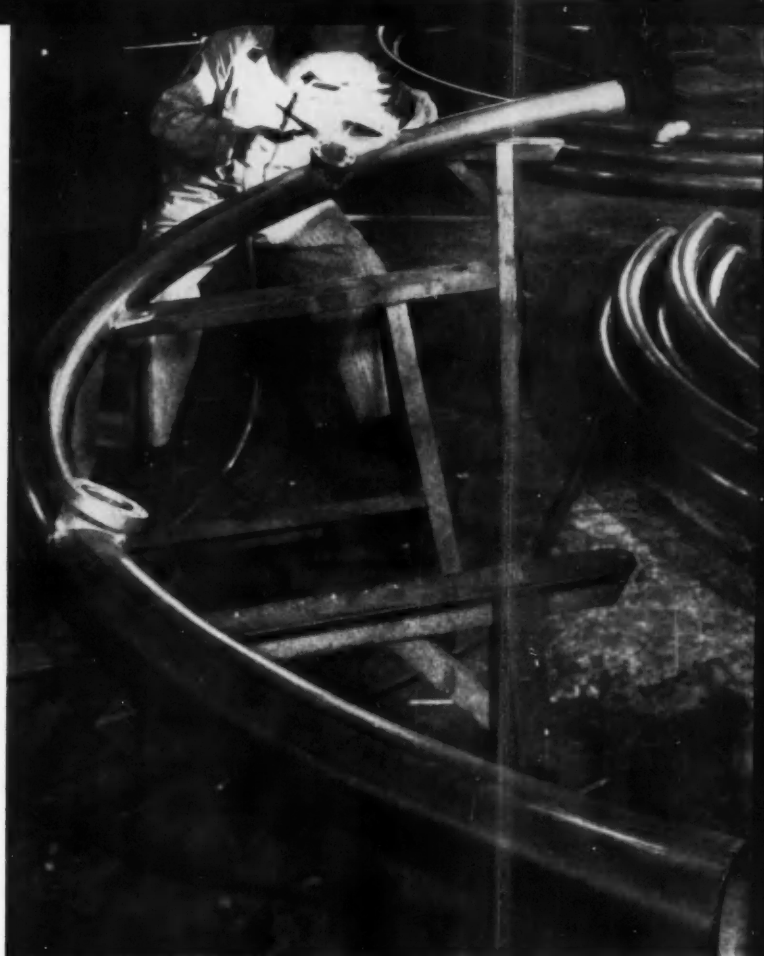


**REPUBLIC NYLOK NUTS** proved to be the solution for fast production and plus-safety features in the manufacture of an automobile steering mechanism, shown above. NYLOK nuts are ideal for automatic feeding, and give permanent, vibration-proof lock. Easy adjustment and re-use assured by permanent resiliency of the nylon pellet. Can be easily backed-off for parts inspection and adjustment. Write for data.



**REPUBLIC CENTURY SERIES** of high strength, stress-relieved, cold finished steel bars meet the needs of steel parts producers requiring high strength with varying degrees of machinability. Available in five grades—C-1144, C-1141, C-1151, C-1050, C-1045—with each grade having a minimum yield strength of 100,000 psi. The CENTURY SERIES assures dimensional stability with excellent machinability, provides high mechanical properties in a range of chemistries. Send for booklet.

Circle 115 on Inquiry Card for more data



**REPUBLIC ELECTRUNITE STAINLESS STEEL TUBING**, Type 304, 4½" O.D., was used to fabricate corona rings for a powerful East Coast Navy Radio Station. Despite the rather severe bend of the 15- and 20-foot rings, the fabricator reported no trouble whatsoever. The rings were made in three sections. ELECTRUNITE was bent to the correct radius. Three lugs were welded to each section. The ends were flared for the insertion of a plug used at the erection site to assemble the unit and suspend it from towers. ELECTRUNITE Stainless Steel Tubing and Pipe are available in most A.I.S.I. analyses from ¾" O.D. to 5" O.D. Send for data.



## REPUBLIC STEEL

*World's Widest Range  
of Standard Steels and Steel Products*

### REPUBLIC STEEL CORPORATION DEPT. AI-9781

1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

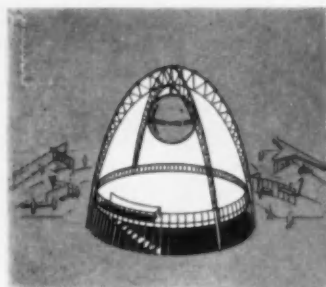
- ☐ Republic ELECTRUNITE® Mechanical Tubing
- ☐ Republic ELECTRUNITE Stainless Steel Mechanical Tubing
- ☐ Republic CENTURY SERIES Cold Finished Steel Bars
- ☐ NYLOK® Bolt and Nut Fasteners

Name \_\_\_\_\_ Title \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



Theme Tower  
Symbol of  
the 1960  
Metal Show

## Why we plan to be in Philadelphia October 17



"Rarely has a meeting meant so much to me as this one. Needless to say, it is a real privilege to be able to participate in this nationally known event, in the many excellent papers to be given, the opportunities to meet old friends and new, and to further our profession."

**V. F. Zackay, Supervisor  
Physical Metallurgy Section  
Metallurgy Department  
Scientific Laboratory  
FORD MOTOR COMPANY**



"The problem of keeping abreast of new developments in today's rapidly changing technology is always difficult. The Metal Show, through its audio-visual presentations of current advances in knowledge, presents a time-condensed package for those interested in metals engineering and processing."

**R. F. Thomson, Head  
Metallurgical Engineering Dept.  
Research Laboratories  
GENERAL MOTORS CORP.**

The experts see the value of the 1960 Philadelphia Metal Show — they know how stimulating it will be, and that's why they plan to attend. They know that a new emphasis on the essential metals and materials, processes and techniques will make the 1960 Show more valuable than ever before . . . a truly dynamic forum . . . some 300 exhibits and 250 technical papers. Attendance will be a sound investment for you and your company!



"The opportunity to attend the Metal Show should be particularly rewarding this year with the participation of many outstanding metal organizations. I anticipate making and renewing acquaintances with professional people who share my interest in metallurgical matters. It is also a worthwhile experience to attend the presentation of carefully selected technical papers and to participate in the resulting discussions."

**R. D. Chapman,  
Asst. Chief Engineer  
Basic Sciences Research  
CHRYSLER CORPORATION**

## NATIONAL METAL CONGRESS and EXPOSITION

Philadelphia Trade & Convention Center • October 17-21

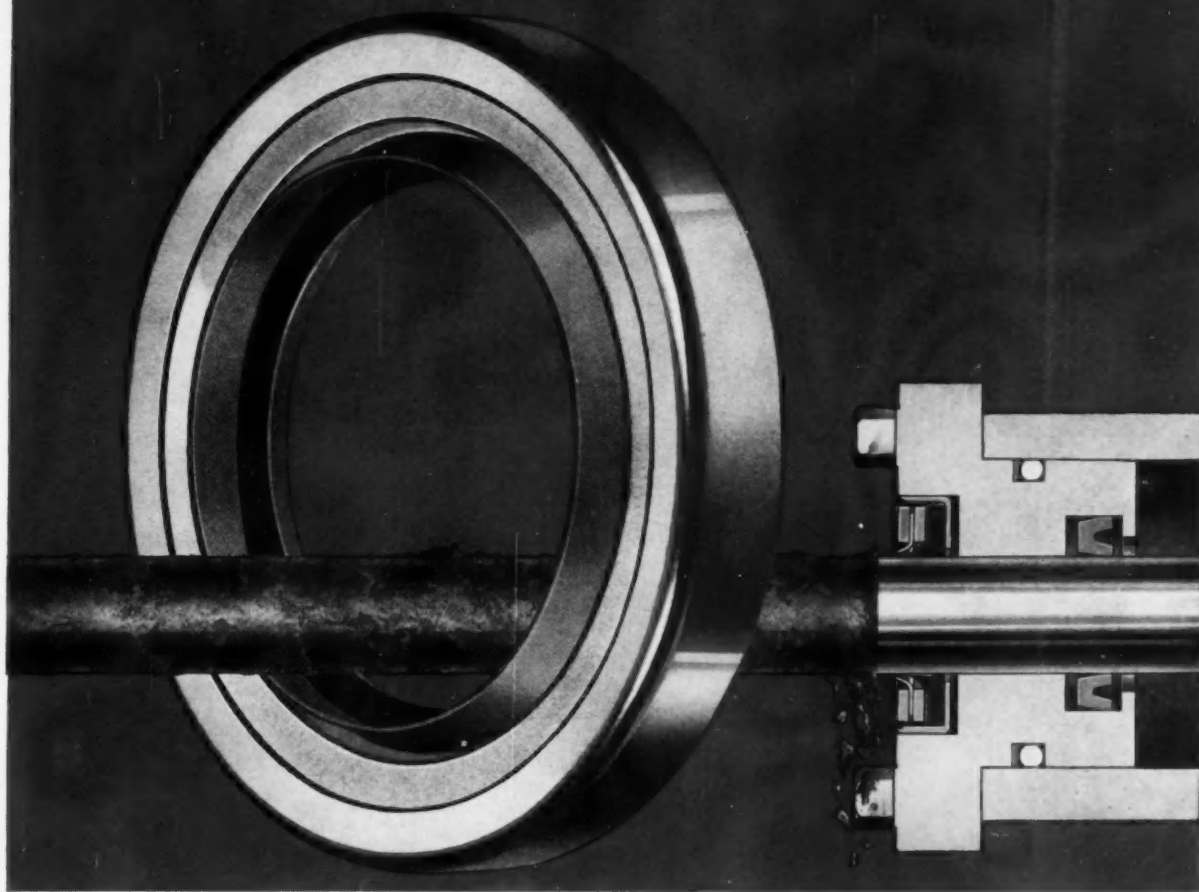
Sponsored by the **AMERICAN SOCIETY FOR METALS** Metals Park • Novelt, Ohio

Cooperating Activities: The Metallurgical Society of AIME; Society for Non-destructive Testing, Inc. Associations presenting technical sessions in cooperation with: Metal Powder Industries Federation; Metal Treating Institute; Ultrasonic Manufacturers' Association;



Industrial Heating Equipment Association; Special Libraries Association—Metals Division; American Society for Testing Materials—Committee B-9; and extensive research and engineering programs of the American Society for Metals, and Seminars.

ANOTHER NEW PRODUCT DEVELOPMENT FROM C/R



## New Wiper-Scraper Seal for Cylinders

*Scrapes off ice, mud, tar – wipes off water, dust, other contaminants*

Now, you can effectively exclude dirt and other contaminants from hydraulic cylinders under the most severe field conditions. One compact unit, the C/R SC Wiper-Scraper Seal does the job. Formerly, a separate rod scraper had to be installed in front of the ordinary wiper seal. The special machining necessary, plus the scraper ring, and retaining ring made this an expensive installation.

Chicago Rawhide's SC Wiper-Scraper Seal combines a spring brass scraper and synthetic rubber wiping member in one steel shell. The I.D. of the scraper is slightly under shaft size to provide a snug fit that will remove tar or frozen mud, but it has sufficient play within the shell to tolerate any off-center conditions of the rod such as caused by bearing "bore-slop." The cost is much lower than any other

combination of scraper and wiper. "Design-in" cost is low, assembly simple. Most important is the performance contribution to the cylinder. The additional value of longer packing life and increased operating dependability with the SC Wiper-Scraper Seal will far outweigh the nominal cost.

For complete information, specifications and standard sizes, write for your copy of C/R's new Bulletin SC-100

### CHICAGO RAWHIDE MANUFACTURING COMPANY

OIL SEAL DIVISION: 1205 ELSTON AVENUE • CHICAGO 22, ILLINOIS

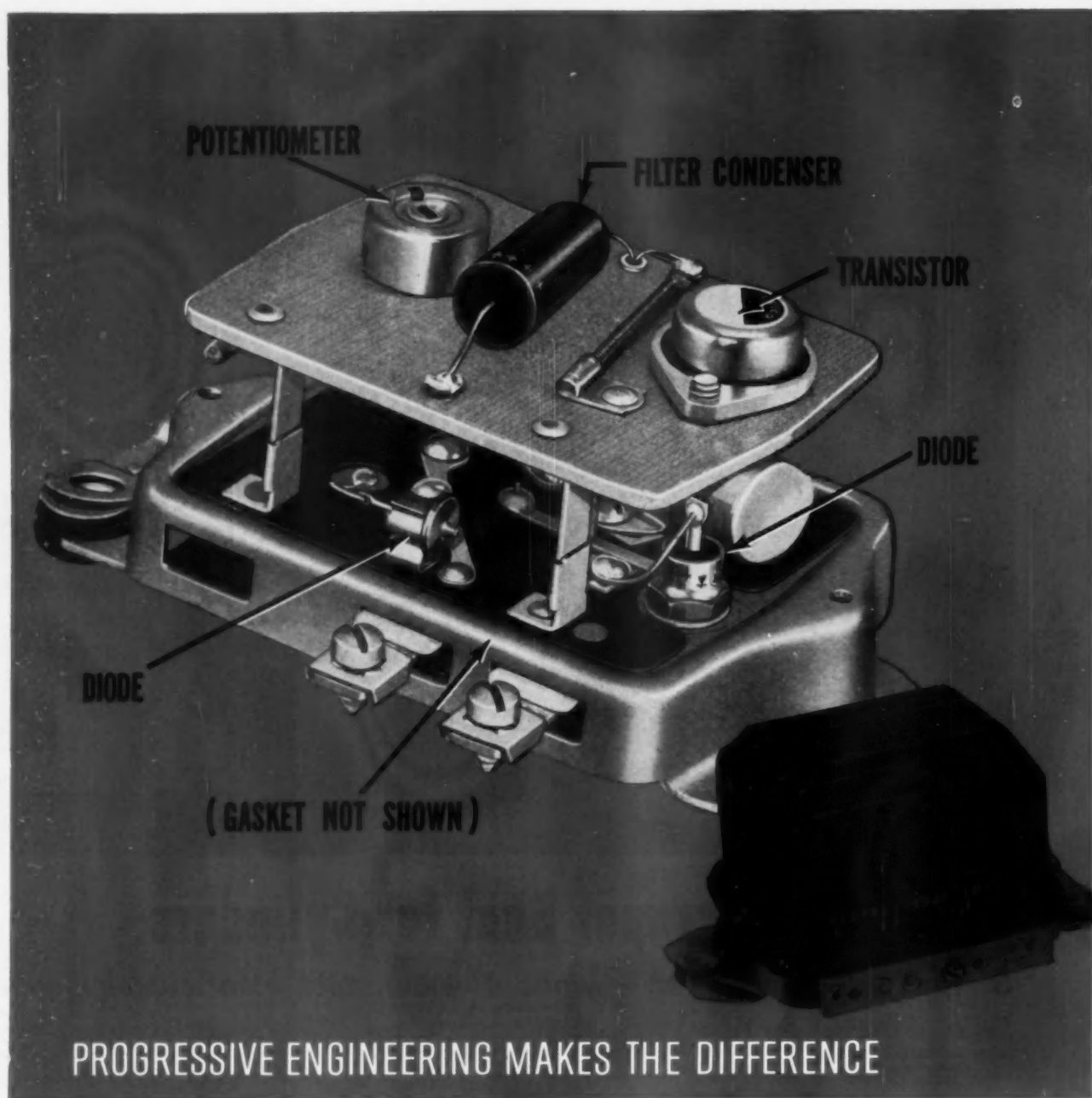
Offices in 55 principal cities. See your telephone book.

In Canada: Chicago Rawhide Mfg. Co. of Canada, Ltd., Brantford, Ontario

Export Sales: Geon International Corp., Great Neck, New York

**C/R Products:** C/R Shaft & End Face Seals • Sirvene (synthetic rubber) molded pliable parts  
Sirvia-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears.





PROGRESSIVE ENGINEERING MAKES THE DIFFERENCE

## ONLY DELCO-REMY OFFERS FULL-TRANSISTOR

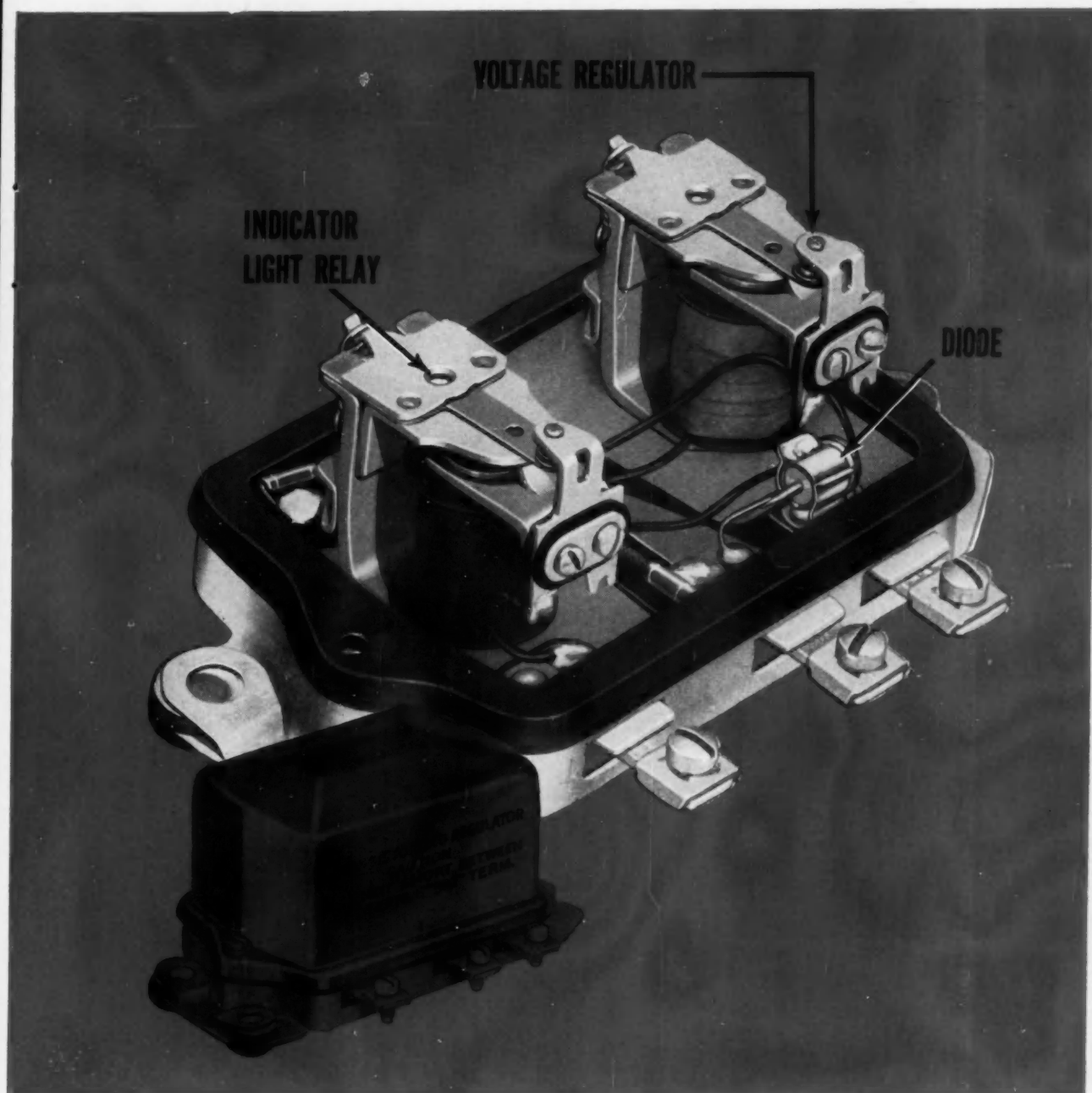
***Designed for use with  
DELCO-REMY'S new self-  
rectifying a.c. generators***

Now you can choose between *two* modern new Delco-Remy regulators—the most accurate available today. One is a full-transistor model, the other transistorized.

The **FULL-TRANSISTOR REGULATOR** has no moving parts and offers the ultimate in accurate electrical performance, durability and reliability. It is composed entirely of transistors, diodes, condensers and resistors, permitting higher field current for better generator performance. Constant voltage control is unaffected by temperature changes, vibration, or mounting position. A simplified external adjusting feature permits easy voltage setting for varying operating conditions. And this full-transistor regulator requires no periodic servicing.

The **TRANSISTORIZED REGULATOR** contains a single transistor and diode working in conjunction with a vibrating-type voltage sensing unit. The transistorized circuit





## AND TRANSISTORIZED VOLTAGE REGULATORS

permits high field current for improved generator performance with low non-inductive current through the contacts for greatly extended contact life. Models are available for circuits containing either ammeters or indicator lights. All units are temperature compensated to better match battery voltage requirements.

Both the full-transistor and the transistorized models have the same mounting dimensions as standard regulators.


Whichever model you choose for your new vehicles or for replacement on present ones, you can be sure of reduced servicing and extended battery life. Available from your car or truck dealer or through the United Motors System.

FROM THE HIGHWAY TO THE STARS

**Delco-Remy**  
ELECTRICAL SYSTEMS



DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA



## valve gear for any engine

*Hydraulic and Mechanical Tappets (Barrel or Mushroom Type) of Alloy Steel, Hardened Alloy Cast Iron, Chilled Iron, or Alloy Chilled Iron • Push Rods • Adjusting Screws • Retainers*

No matter what your valve gear requirements, it will pay you to check with Chicago's Tappet Division. For here you get the benefits of specialized techniques and facilities which, in 25 years of producing tappets and other valve gear, have established long records of trouble-free service . . . verified in over 25 million engines.

Chicago's special staff of tappet engineers can provide complete valve train designs for all types of engines . . . car, truck, tractor, diesel . . . aircraft, outboard, power mower, or industrial.

Their particular skill in development engineering will also prove a valuable addition to your own engineering staff. And the unique manufacturing and precision testing facilities especially developed by Chicago for valve train production provide you assurance of dependability and long life.

Whatever your valve gear problem, just call Chicago's tappet engineers today. You will find it advantageous to contact Chicago *while you are still in the preliminary design stages.*

## THE CHICAGO SCREW COMPANY

ESTABLISHED 1872 • DIVISION OF STANDARD SCREW COMPANY

2701 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS



## TOMORROWNESS

That's what you get today when you design with the **NEW PHENOLICS**. Here's why. You can do things with the *new* phenolics that you can't do with other materials.

*Idea:* Cut the cost of mass-producing a water-pump impeller—and get an impeller that *doesn't corrode*.

*Idea:* Make a fan that won't bend out of shape, can't warp, and runs whisper-quiet for years.

*Idea:* Take the hum and drum out of heater housings and air ducts—for good.

You can get phenolics from Durez husky enough to make oil-pump gears and transmission parts that outlast metal... versatile enough to stand heat and vibration as a low-cost distributor bowl case. And this is only the beginning.

When you design with today's harder-working phenolics, you're almost always dollars ahead. They cost less per pound

and per cubic inch than many other materials. They're always in supply. Their price is stable. They can save you the whole cost of machining and finishing a part.

Your molder knows these materials well. He can put them to work for you—in ways you may never suspect until you discuss it with him. Let him bring you up to date soon on these versatile plastics that take you where other plastics can't go. Or write us directly for descriptive Bulletin D400, or for help on a specific application.

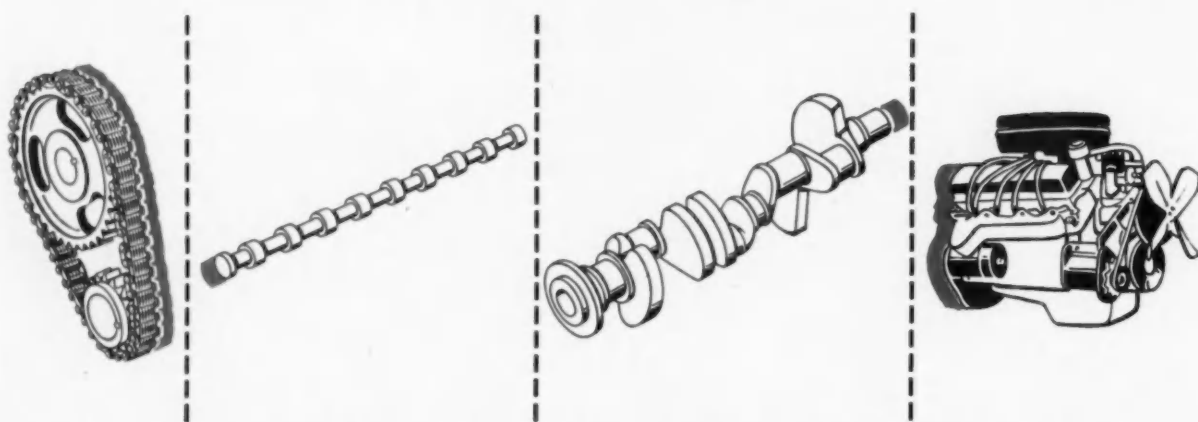
## DUREZ PLASTICS DIVISION

8209 Walck Road, North Tonawanda, New York

HOOKER CHEMICAL CORPORATION



# Link-Belt's narrow timing chain started... a cost-shaking "chain reaction"



Narrow chain and sprockets = Shorter camshaft + Shorter crankshaft + Shorter engine length

## narrow timing chain puts savings in the millions

Automobile engine designs that begin with Link-Belt's *narrow* timing chain lead to appreciable savings: shorter camshaft, shorter crankshaft, narrower face sprockets, shorter overall engine length. Total savings? Millions of dollars for the manufacturers who use it!

This durable chain closely maintains factory-set timing during thousands of miles of car operation. Segmental bushings automatically provide snug joints, reduce "slap," resulting in longer and quieter chain life.

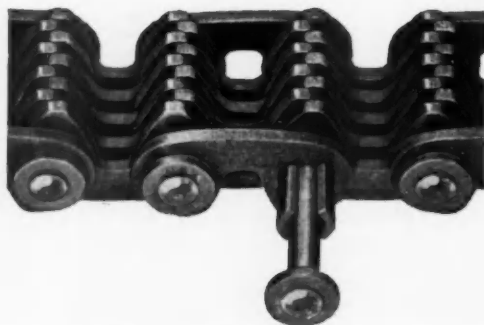
Ask us about how this chain has accommodated a more-than-100% increase in engine horsepower. Let us show you why Link-Belt timing chains are standard with three of the four major automotive manufacturers. Write for Book 2065 for complete specification data.

15,302



**LINK-BELT**  
TIMING CHAINS AND SPROCKETS

LINK-BELT COMPANY: 220 S. Belmont Ave., Indianapolis 6, Ind.



**LONG-LIFE DESIGN** with round pins free to rotate—not tied together with extra links—distributes wear evenly over entire surface of pins. Segmental bowed bushings maintain snug joints, assure thousands of miles of quiet, accurate timing.



**BUILT-IN JOINT CHECK** across entire width of chain arrests chain "whip." Elastic guide links, with same cross-section as load carrying links, maintain equal load distribution across entire width of chain. No connecting links, no solid guide links to increase weight and centrifugal loading at high engine r.p.m.

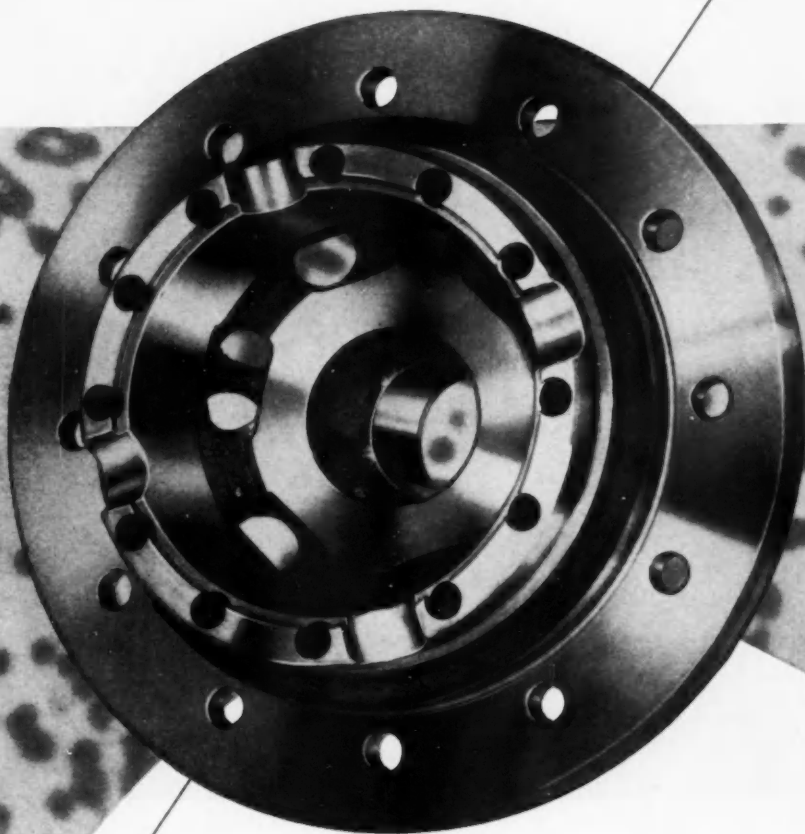


is your problem

# machinability?

**NATIONAL HTM CASTINGS**

are the answer



There are many reasons for specifying HTM (Pearlitic Malleable) castings for your product. One is *machinability* of 70-90 percent (B1112 steel = 100).

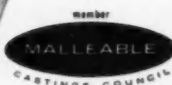
But there are many other equally valid reasons. High ultimate strength . . . extreme wear resistance under heavy loads and high speeds . . . non-seizing qualities . . . air or liquid quenching . . . ability to be smooth-finished.

So when you're looking over the materials field, don't overlook the advantages of HTM castings. For HTM metal can be cast by either the shell mold, CO<sub>2</sub>, or green sand methods. This means production costs tumble . . . performance and saleability of your product go up.

#### Important Physical Properties

Brinell	163 to 302*
Yield, psi	48,000 to 85,000*
Ultimate, psi	70,000 to 110,000*
Elongation, %	7 to 2*

\*Depending upon grade



**NATIONAL MALLEABLE CASTINGS COMPANY**

Established 1868

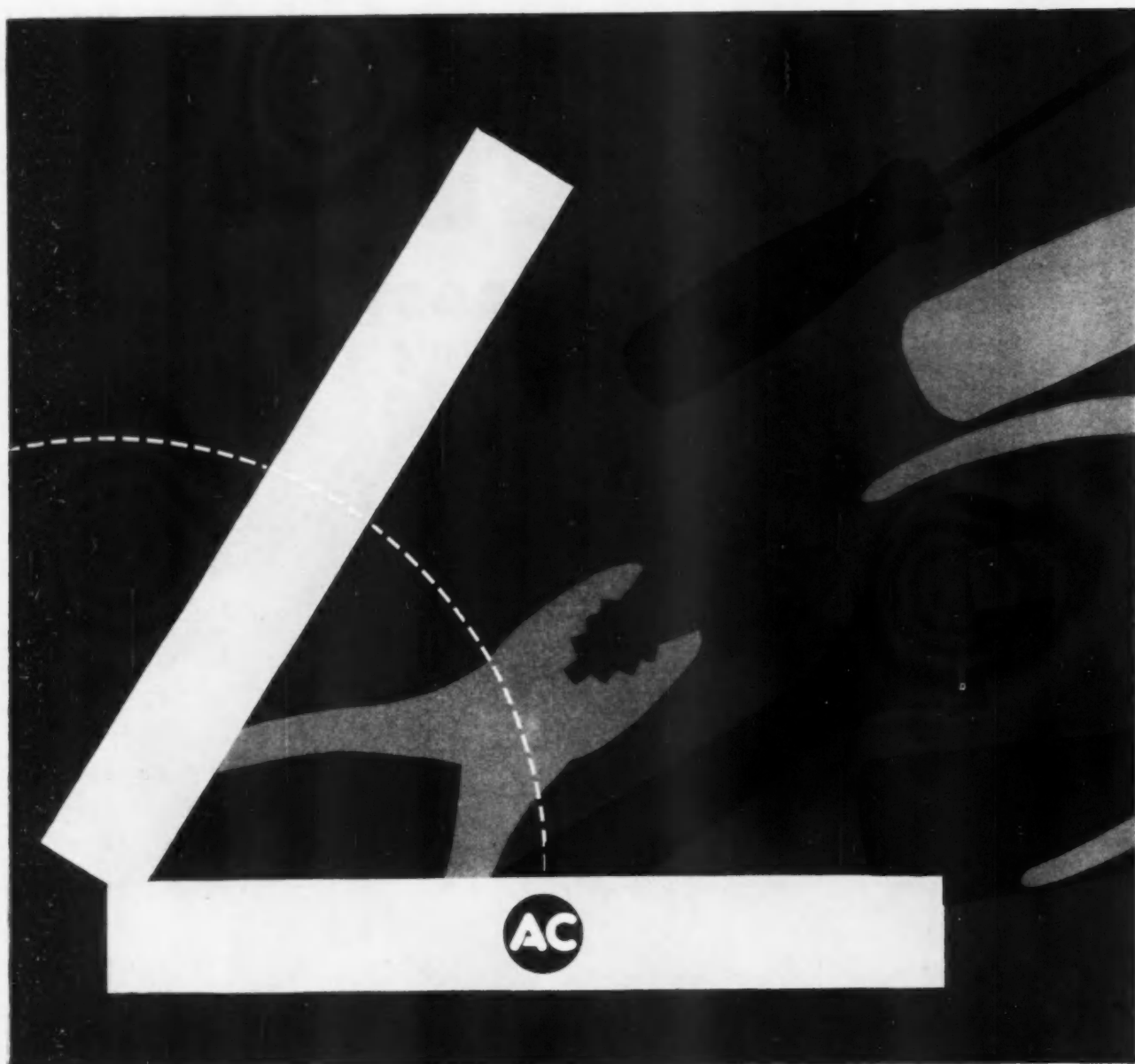
Cleveland 6, Ohio

AA-6832

The nation's largest independent producer of malleable and pearlitic malleable

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. . . THE CASE FOR



Like a complete tool case . . . AC houses the skilled manpower and facilities that can be your tools for designing and building better products . . . with less effort!

# SKILL AND KNOW-HOW



If your design and engineering problems involve one of the quality AC products below—then call on AC. AC's vast manufacturing and testing facilities and over 600 specialized engineers and technicians stand ready to serve you. AC is fully staffed and equipped to make prototype and customer samples for any AC product that will help make your end product perform the best job possible. Why not draw on AC's unsurpassed knowledge and facilities now . . . by contacting the closest AC field office below? You'll get fast ACtion at AC!

## AC SPARK PLUG THE ELECTRONICS DIVISION OF GENERAL MOTORS

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## AC RELIABLE PRODUCTS HELP YOU SELL

Air Cleaners & Silencers • Ammeters • Automatic Controls for Vehicle Heaters • Combination Fuel & Vacuum Pumps • Crankcase Breathers • Crankcase Ventilation Valves • Cruise Controls • Die Castings—Decorative & Structural • Flexible Shafts • Fuel Pumps—Mechanical & Electrical • Gauges—Gasoline, Oil, Air, Temperature • Instrument Panels—Automotive, Aircraft, Marine • Jet Engine Igniters • Oil Filters—Lubrication & Fuel • Pressure Switches • Radiator Pressure Caps • Rotary Vacuum Pumps • Spark Plugs—Automotive, Aircraft, Marine • Speedometers • Strainers—Gasoline • Switches—Oil Pressure, Temperature • Tachometers • Transistorized Inverters.



GOWN BY FON TAYNE; STAINLESS



*stainless from creative Crucible*

## Crucible Stainless reflects beauty

Crucible stainless steel possesses its own beauty—a finish that is truly lustrous and gleaming. This finish is produced on the most modern mill equipment, by Crucible craftsmen, to exact processing specifications.

Add the beauty of Crucible stainless to your products—to reflect your products' quality. For samples of this remarkably fine finish—and engineering services that match it—call or write the nearest of Crucible's 35 local steel service centers.

**CRUCIBLE**

Stainless Steel

SHEET, STRIP, BAR AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA, PITTSBURGH 30, PA.

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for more data



## "How's she running, Bobby?"

Bobby's slick, little racer is probably running "fine", for it has a relatively simple engine with a minimum number of parts to worry about. Modern production-built automobiles are, of course, more complicated. For example, take the carburetor—heart of an automobile engine. It's a complex mechanism with as many as 90 to 125 separate parts and assemblies.

And—each model carburetor must be designed, engineered and built to the exact requirements of the car and its engine if smooth, efficient performance and maximum economy are to be assured.

Holley has been supplying precision-built carburetors to major manufacturers of automobiles for over 55 years. Through continuing research, Holley has contributed numerous improvements and new developments to carburetion and ignition to keep pace with the changing demands of cars and their engines.

In 1960, Holley Carburetors are *original equipment* on ten popular makes of cars—including four of the seven compacts built in the United States.



*Holley Carburetors and Ignition Equipment maintain the Holley reputation for precision quality and dependable performance.*

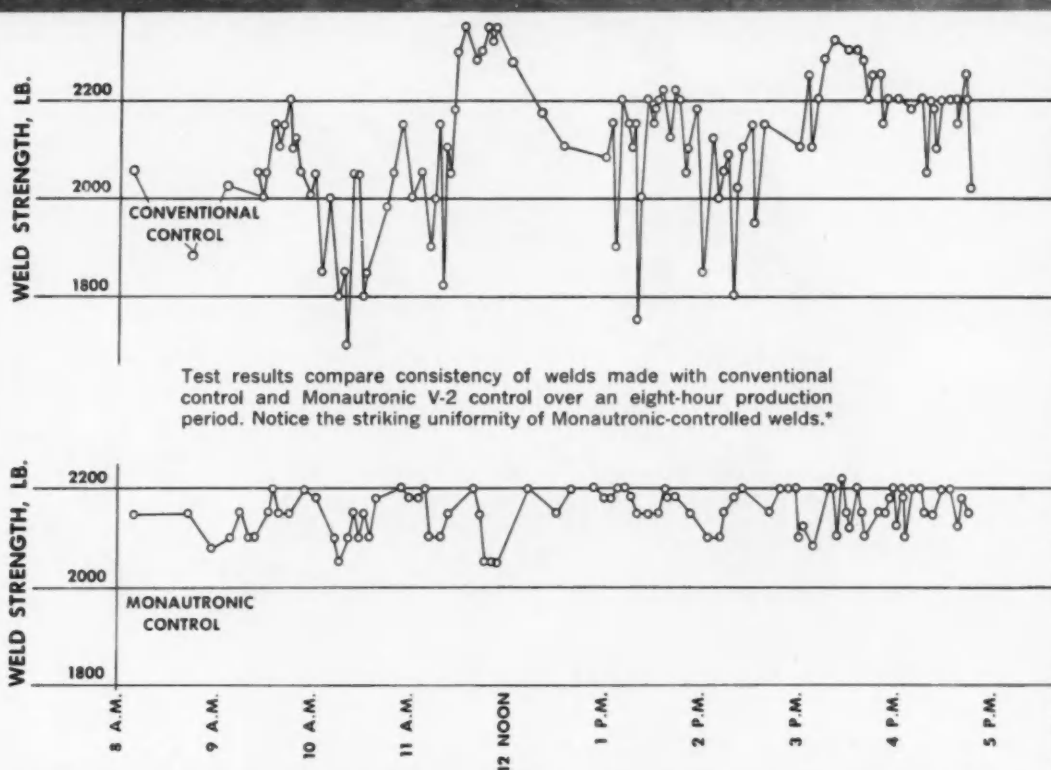
**HOLLEY**  
*Carburetor Co.*

*Researchers and Developers  
in THREE of America's  
Most Important Industries*

11955 E. Nine Mile Road • Warren, Michigan

I-33

**AUTOMOTIVE DIVISION • AIRCRAFT DIVISION • ELECTRO-MECHANICAL DIVISION**



## new feedback control gives you consistently high quality welds ... automatically



Monautronic V-2 welding control has fully automatic sequencing with all provisions for single spot, roll spot and seam welding.



The new *Monautronic V-2* welding control makes use of the latest advances in electronic computing to overcome automatically such obstacles to weld quality as line voltage fluctuation, electrode wear, variations in electrode tip force, surface finish and shunting.

The control compensates for undesirable variations usually encountered in resistance welding by maintaining voltage across a weld at a constant value. This constraint of voltage amounts to constraint of final weld temperatures, and such temperature control assures uniform production of high quality welds.

Any metal that can be resistance welded can be welded better with the Monautronic V-2 than with any other control on the market.

For complete details, contact THE BUDD COMPANY, Electronic Controls Section, Philadelphia 32, Pa., or one of our regional offices.

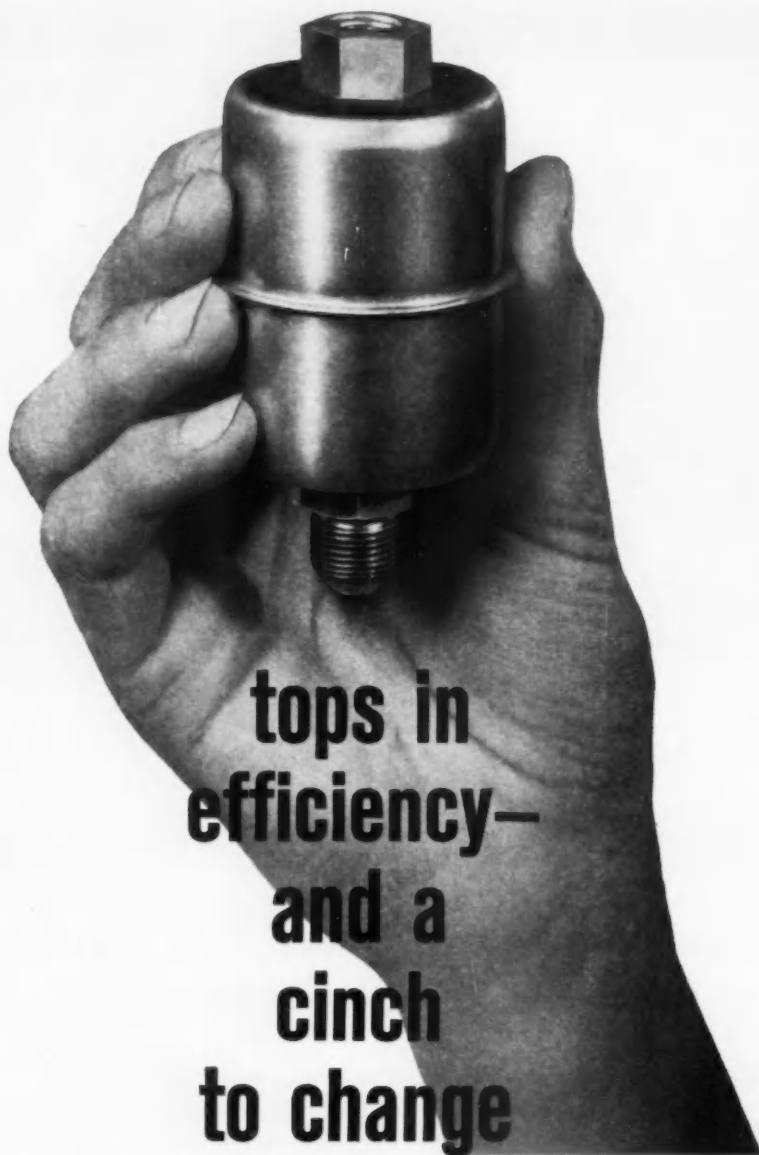
\*Case study upon request.

2450 Hunting Park Ave.  
Philadelphia 32, Pa.

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ELECTRONIC **Budd** CONTROLS



**tops in  
efficiency—  
and a  
cinch  
to change**

**HERE'S ALL YOU DO!** Unscrew the two fittings that join the Purolator GF-11 Filter to the fuel line. Throw away the dirty filter. Fasten in the replacement. Now you're ready for 5,000 miles of efficient, trouble-free fuel filtration. Total time involved? *Less than 5 minutes.*

**MOTORS RUN SMOOTHER...** Because this Micronic® filter removes dirt, metal, rust, scale and gum... even microscopic particles down to 5 microns.

**ADAPTABLE TO ALL GASOLINE ENGINES.** Purolator fuel filters like the GF-11 shown above, are standard equipment on most 1960 cars. However, it can be incorporated into the fuel system of almost *any* gasoline engine — automotive, portable or marine.

**MORE ADVANTAGES.** Easy installation and replacement is a big reason for the popularity of the Purolator GF-11 Fuel Filter. But here are more:

**\*PEAK EFFICIENCY.** Because Purolator replacement filters are inexpensive, and easily installed, chances are they'll be replaced at proper intervals — *and always work at peak efficiency.*

**\*LONGER SERVICE LIFE.** Because of the special pleated construction of the filtering unit, the GF-11 has fully *70 square inches* of filtering surface. It operates longer at peak efficiency.

**\*COMPACTNESS.** The GF-11 measures about 3" by 1½". It can be installed either horizontally or vertically.

**\*VERSATILITY.** The GF-11 Filter can be installed as an O. E. M. item on practically any gasoline-engine — from sport cars and garden tractors to power mowers and midget racers.

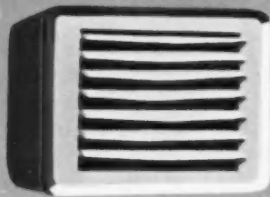
For complete information on the GF-11 and other Purolator filters, write to Purolator Products, Inc., Department 3849, Rahway, New Jersey.

Filtration  
for Every  
Known Fluid

**PUROLATOR**  
**PRODUCTS, INC.**

Rahway, New Jersey, and Toronto, Ontario, Canada



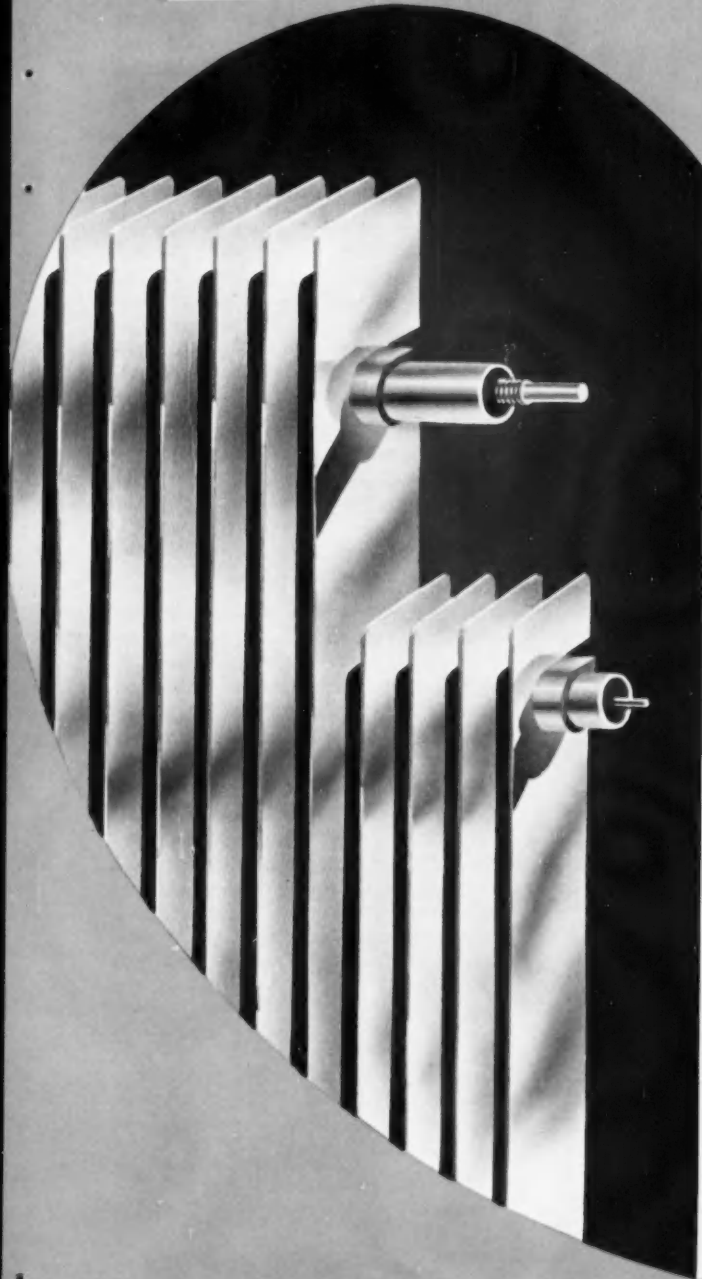


this electric unit heater has a **stainless heart**

for better function  
longer life

# Superior

STAINLESS STRIP STEEL



The electric unit heater illustrated is a product of MARKEL Electric Products, Inc., Buffalo 3, N. Y.

In this high-efficiency, heavy duty electric unit heater, Superior Stainless Strip Steel does a vitally essential job. The helical coil elements are sheathed in our stainless—the heat-distributing fins are Superior Stainless too. Only stainless combines the physical strength, long life and corrosion resistance required by this exacting application . . . and Superior Stainless provides the unvarying quality and uniformity required for trouble-free fabrication. Can we serve your own special projects for stainless steel?



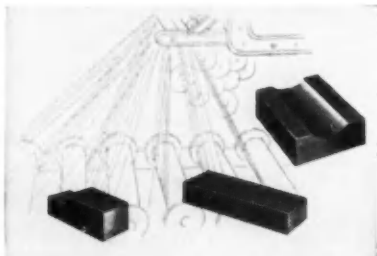
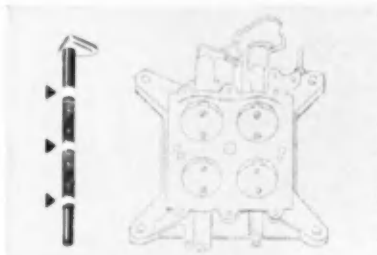
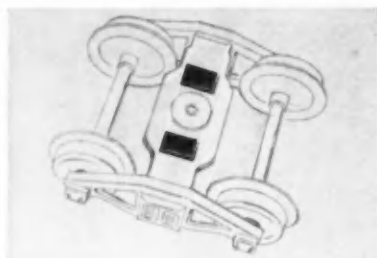
**SUPERIOR STEEL DIVISION**

OF  
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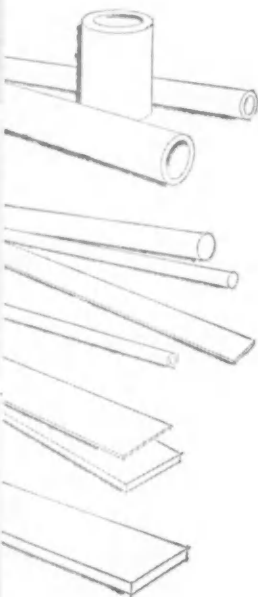
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## NEW TEFLON BEARINGS

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Railroad truck bearings (top), carburetor bearings (center), and saddle bearings for textile machinery (bottom)—fabricated from top-quality Teflon\* stock by Garlock—offer performance unmatched by any other material.



**Now—new bearings of Teflon eliminate lubrication . . . resist extreme temperatures and reactive chemicals . . . drastically reduce downtime.**

**No finer combination of properties.** Bearings of Teflon offer a lower coefficient of friction than any other solid material; they have exceptional thermal stability and are suitable for continuous service to +500°F; they are completely resistant to nearly all chemicals and solvents; they are tough, abrasion-resistant, have no moisture absorption.

**Applied where safety and reliability are essential.** Teflon is used as journal and thrust bearings, and on other sliding surfaces where lubricated bearings are undesirable, or incapable of operation in extreme temperatures or corrosive conditions, or where there is a possibility of lubricant failure. Teflon bearings afford unexcelled performance where slip-stick motion must be minimized . . . on reciprocating and oscillating systems where the lowest possible static friction must be attained . . . where space and weight savings are essential.

**Easily fabricated from high-quality Garlock stock shapes.** Teflon bearings can be simply and economically made from standard Garlock tape, bar and rod stock available through local Garlock distributor outlets. Or, if you wish, Garlock will work to your exact specifications in furnishing bearings of all tolerances and size. Whatever the case, the key to best bearing performance is through the use of Teflon stock shapes by Garlock. With years of experience in research and processing of plastics, Garlock is able to recommend and furnish *exactly* what you need, when you need it, and at the lowest possible cost.

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# NEWS

Vol. 123, No. 6

Sept. 15, 1960

## F-85 Called Olds Kin 'Family Resemblance' Stressed at Preview

By Hugh C. Quinn, Detroit Regional Editor  
and C. B. Campbell, News Editor

Oldsmobile is reaching into the low-priced field this fall with the introduction of the F-85. Jack Wolfram, Oldsmobile General Manager, considers the F-85 a part of the regular Olds family, and not a separate "breed."

Speaking at the preview of the 1961 Oldsmobile line in Detroit earlier this month, Wolfram said, "You can tell at a glance that the F-85 is an Oldsmobile—it has strong family resemblance. The sheet metal, hood, bumpers—in fact the total appearance of the car is distinctively Oldsmobile."

### 112 In. Wheelbase

The F-85, built on a 112 in. wheelbase, is 188 in. overall—24 in. shorter than the Dynamic 88. All the standard cars are 3½ to 5½ in. shorter than 1960 models, and 3½ in. narrower inside, although shoulder room is virtually unchanged. The F-85 is powered by an aluminum V-8 engine.

Wolfram said he expects new car sales of 6.8 million this year, and at least that many, maybe 7 million, in 1961. He would not, how-

ever, venture a prediction of Oldsmobile sales for the coming year,

other than to say they were expected to be as good as this year.

He expects the F-85 to be plus business for Oldsmobile, bringing people into showrooms. He said the new car is designed for those people "who have always wanted to own an Oldsmobile" but couldn't afford it. The F-85 will fit in with the "historical low priced cars," Chevrolet, Ford, Plymouth and Dart.

### THUNDERBIRD WITH STAINLESS STEEL BODY



The Budd Co. made the parts for Thunderbird for Allegheny Ludlum Steel Corp. While unprotected from the elements, Allegheny Ludlum engineers claim the body will outlive anyone alive today. The four-passenger, 300 hp model, to be displayed at auto shows, has specially made stainless steel muffler, grille and bumpers.

Although the F-85 initially will be built in two body styles—four-door sedan and four-door station wagon—Wolfram said there are plans for a three-seat wagon later.

A preview of the new Chrysler line was held in Miami on September 7 and 8.

L. L. Colbert, Chrysler President and Board Chairman, said the new year will be "every bit as good as 1960, when sales will hit at least 6.5 million passenger cars." Chrysler hopes to improve its penetration beyond the 15.8 per cent recorded so far this year.

With the introduction of the Lancer by the Dodge Div., the Chrysler Corporation will have four car lines in the price group where Plymouth stood alone only a year ago. Colbert told the press meeting that cars in this price group will take an estimated 80 per cent of total market by the end of the 1961 model year.

#### Counting on Lancer

Chrysler is counting heavily on Lancer, Valiant, Plymouth and Dart. Plymouth, Dart, and Valiant nearly doubled the sales penetration marked by Plymouth alone in 1959, and Lancer should add to this performance in 1961.

In referring to the Lancer, M. C. Patterson, Dodge General Manager, called it "a small car with a big car ride." The ride, he explained, has been achieved by combining favorable weight distribution, a low center of gravity and torsion-air suspension.

Patterson cited the wide choice of accessories and equipment available with the Lancer: two six-cylinder engines, a three-speed automatic transmission, power brakes and power steering, air conditioning, tinted glass, rear window defroster, plus standard options such as radio and heater.

#### Col. White Assigned

Col. Rex H. White, Jr. has been assigned as chief of research and engineering, Army Ordnance Tank-Automotive Command, Detroit. He formerly served as director of the laboratories division at the Detroit Arsenal.

#### Ford of Canada To Produce Comets

Ford Motor Co. of Canada will begin building the Comet with the start of 1961 production. The car will be assembled at Oakville, Ont., with some manufacturing done at Ford of Canada's Windsor plant. Comet will be sold by Mercury-Meteor dealers in Canada, according to John D. King, vice president-marketing.

Meanwhile, the Frontenac is being phased out of production. The Frontenac is an adaptation of the Falcon that the Mercury-Meteor dealers sold during the 1961 model year. Falcon is marketed through Ford-Monarch dealers.

#### Curtiss-Wright Ltd. Delays Air Car Plans

Canadian Curtiss-Wright Ltd., Toronto, has dropped plans to produce an air car this year.

"The early thought of putting it in production in Canada is very much in abeyance," said G. D. Zimmerman, executive vice president and managing director.

In the U. S., where the car was developed, Curtiss-Wright Corp. has 25 of the air cushion vehicles in production, for various military applications.

#### Studebaker-Packard Gets New Chief

Studebaker-Packard Corp. has named Clarence Francis, former Chairman of General Foods Corp., as new Board Chairman and Chief Executive Officer. Harold E. Churchill, President since 1956, continues in that post.

Francis said Churchill will act in a staff capacity in engineering. Francis said that Studebaker-Packard's changing requirements as a diversified company make the need for a realignment of duties evident. Churchill stated "that this realignment of responsibilities will permit me to concentrate my efforts in the areas where I can make the greatest contribution to the growth of our company."

Francis was President of General Foods Corp. for nine years and Board Chairman for 11 years.

#### DATSUN BLUEBIRD IS 1961's FIRST



First 1961 model on American market is Japanese make. Nissan Motor Co., its producer, claims 35 mpg. Koichio Asaki, Japanese ambassador to U. S. (left), accepts delivery of first '61 model from Soichio Kawazoe.



## Chevrolet on Way To Its Best Year

Chevrolet is on the way to its best year in history—better even than the legendary 1955, when all the industry went wild. And Chevrolet, says General Manager E. N. Cole, expects to beat out Ford for first place by 300,000 units.

Mr. Cole sees nothing but roses for Chevrolet. At the preview of the new Chevrolet line a fortnight ago, Mr. Cole told newsmen the final sales total for 1960 probably would be 1,750,000 cars and 335,000 trucks. This total of 2,085,000 vehicles would top the 1955 mark of 2,066,337, and it would be about 15 per cent over last year.

Mr. Cole gives Corvair a large share of the credit for his division's success. Corvair sales this year are expected to reach 251,000—about 12.3 per cent of total business. Big car sales are up about one per cent over last year.

Mr. Cole looks for sales of between 300,000 and 350,000 Corvairs in 1961.

Chevrolet has placed complete faith in the compact Corvair, and this faith is exhibited in the five new Corvair models for 1961. These new vehicles indicate that Chevrolet management is convinced the market for vehicles in this price group is growing stronger, and is not just a passing fancy.

Corvair is adding the Lakewood, a conventional four door, six-passenger station wagon; and four cab-over type vehicles in the 95 Series—Greenbrier sports wagon, a panel version of the sports wagon, and two pick-up trucks. All will have the standard Corvair rear engine, transaxle, suspension and other components.

The Greenbrier will be available with two or three seats, plus cargo capacity in the rear. The panel

version will come with either rear-opening or side doors for multi-stop delivery. One pick-up has the conventional tail gate, the other has a swing-down gate that meets the sidewalk to form a ramp.

Mr. Cole said he believes first-year sales of the new series will reach 40,000-50,000 units.

The only change in the standard Chevrolet line-up for '61 is the addition of a two-door Impala sedan. And speaking of models, Mr. Cole also declared that Chevrolet is not

planning a Corvair convertible, since volume would be too low to warrant the expense.

Mr. Cole, incidentally, revealed the "official" GM prediction for industry volume in 1961—the prediction that will be used by other GM executives in later appearances. He said the 1960 year will end up with sales of 6.8 million cars in the U. S., with 1961 going "as high as" seven million passenger cars and a million trucks.

## ALL-ALUMINUM DUMP TRUCK BODY



Manufactured by Anthony Co., Streator, Ill., lightweight aluminum body of dump truck is 1000 lb lighter than comparable steel body. It is made of aluminum alloy 5454 plate, 6061-T6 extrusions and 5356 welding wire.

# NEWS

CONTINUED

## Engine Line Changes Cause Ford Layoffs

Ford Motor Co. will lay off 1200 workers at its Brook Park engine plants in Cleveland while it rebuilds and rearranges an engine line. The workers will be idle until some time in 1961.

The line to be rebuilt currently produces V-8 engines for Ford passenger cars. The company did not say what the line will produce when rebuilding is completed.

The layoff affects 800 employees in engine plant No. 1. Another 200 will be shifted to engine plant No. 2, which makes six-cylinder engines. There has been a heavy demand for this engine. Another 900 at No. 1 plant will be utilized in a retooling program. Also facing a layoff are 400 employees at the foundry plant. The foundry supplies engine blocks for both engine plants.

## S-P Looks Ahead To 25 Pct. Sales Rise

Studebaker-Packard Corp. oblivious to any talk of gloom, is looking ahead to a 25 per cent sales boost in 1961. Despite the onslaught of more compacts from the Big Three, S-P expects sales to reach 150,000 cars in '61, up from the anticipated 120,000 for 1960.

S-P has rearmored itself for the coming battle with a new six-cylinder OHV engine, a new 113-in. wheelbase luxury compact, and a sleeker look for the Lark. With these three major items, plus a few other improvements such as a new steering system, the company hopes to be able to start the sales curve on its way up again.

Model year retail sales are running just a fraction ahead of last year, which was a \$28.5 million

profit year for S-P. But one of the chief problems this year, other than the stiff competition of the new compacts, was the old L-head six-cylinder engine, virtually unchanged since before World War II.

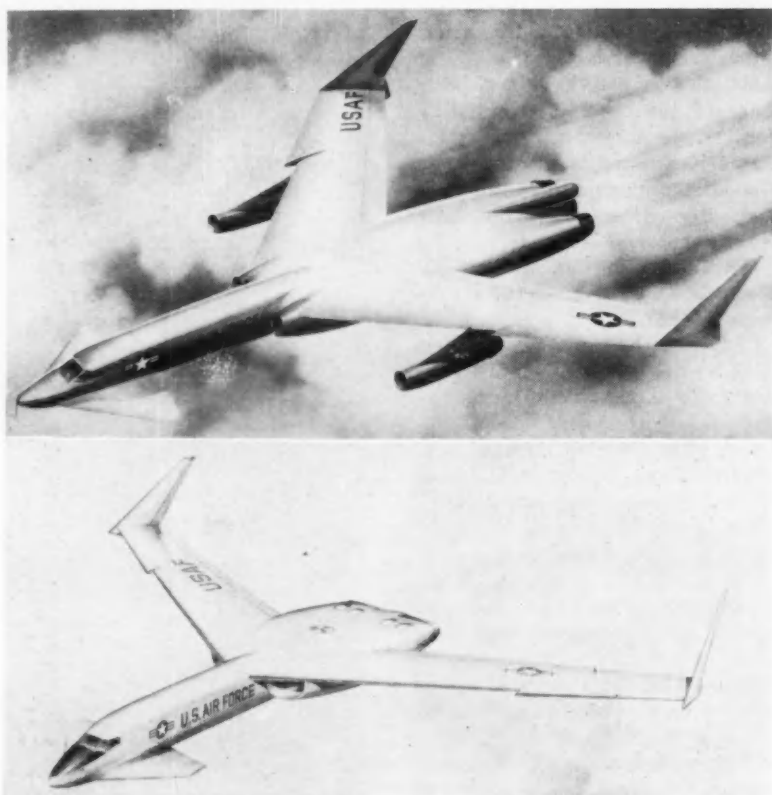
Corporation officials hope the new Skybolt engine will perk things up a bit. Although bore and stroke are the same as on the old engine, horsepower has been increased from 90 to 112.

## Yale & Towne Offers Compact Fork Lift

Design advances have been built into the Yale G-54 LP-gas and gasoline powered industrial lift trucks. Improved power transmission, mast construction, compactness, operating speeds, stability, operator comfort, and ease of maintenance are claimed.

The G-54's short turning radius, 70 in. for the 300 lb capacity model, plus fast lift speed result in speedier and more economic operations, engineers report. An automatic torque transmission is standard in all G-54s. The cushion tire model uses a single range constant mesh type while the pneumatic tire model utilizes a two-speed range transmission. Both feature interlocking I-beam mast construction.

## NUCLEAR PLANE DESIGNS FOR AIR FORCE



Two versions of atomic-powered aircraft being designed by Convair Div. of General Dynamics Corp. The craft in upper photo would be powered by direct-air-cycle nuclear engines mounted in tail of fuselage, plus two conventional jet engines beneath wings. The lower photo is of another version of nuclear plane. It would be powered by engines mounted in tail.



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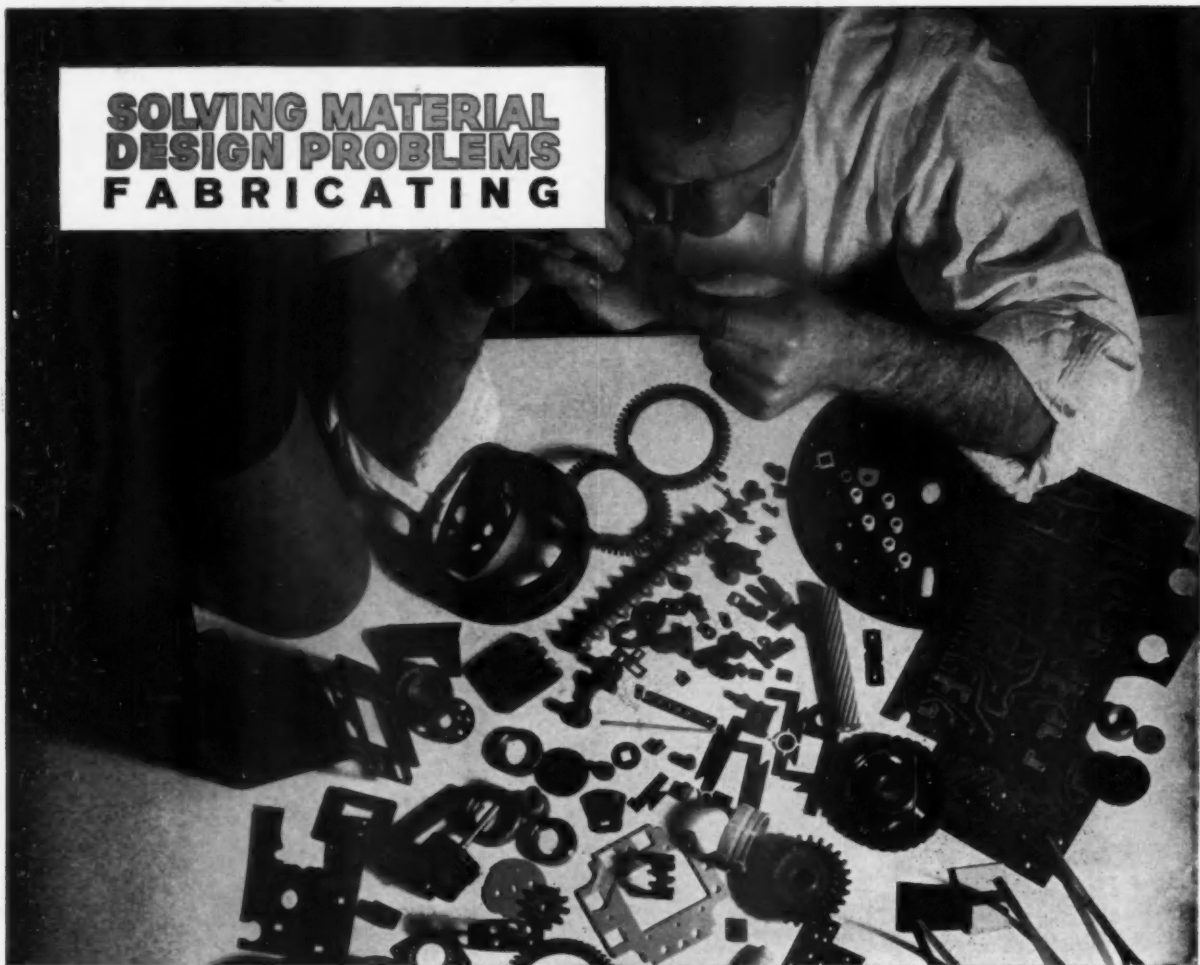
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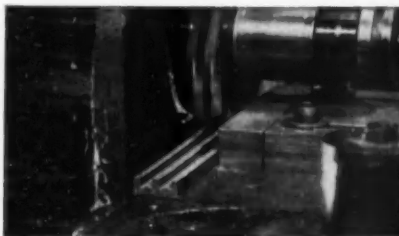
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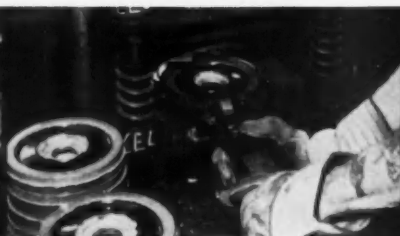


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® A SUBSIDIARY OF THE **Buick** COMPANY • NEWARK 2, DEL.  
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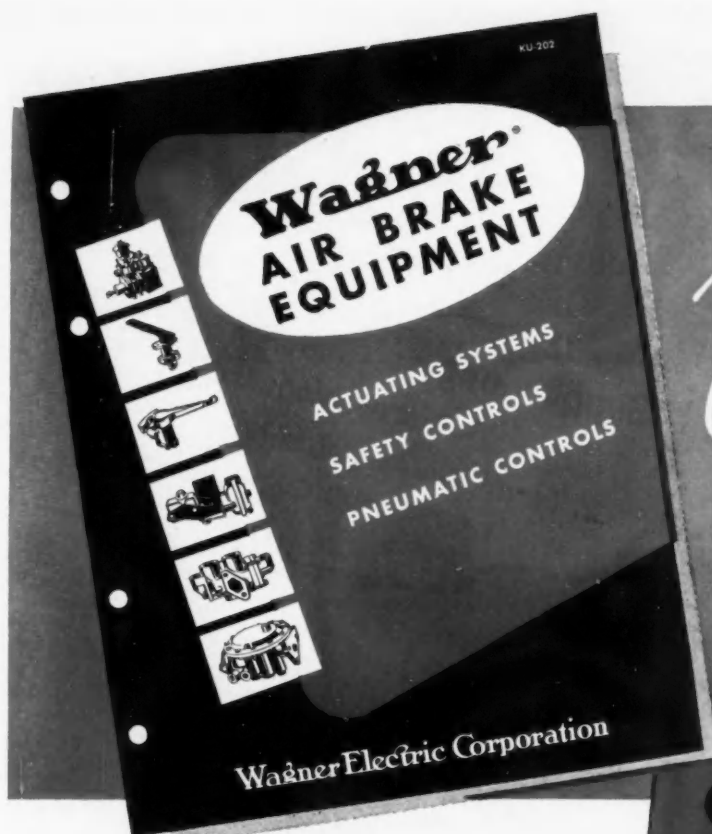


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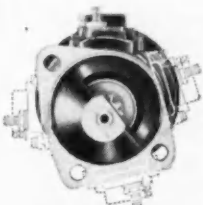
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**MORE COMPACT.** Shifting solenoid located inside pinion housing coaxially with shaft. No external parts interfere with engine or accessories.

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**MORE VERSATILE.** Rugged one-piece pinion housing designed so that a flat for terminal and switch can be machined at any point on circumference. Results: almost unlimited mounting positions; one motor can be adapted to several different engines.



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**EASIER SHIFTING.** Solenoid, pinion and motor switch operate in a direct line. Provides accurate and reliable motor timing.

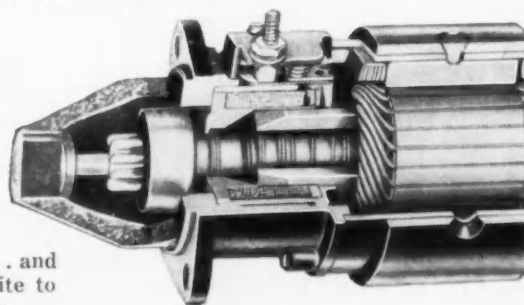
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Want to know more about Co-Ax Starting Motors ... and how they can simplify engine design for you? Write to Autolite, Electrical Products Division, Toledo 1, Ohio.

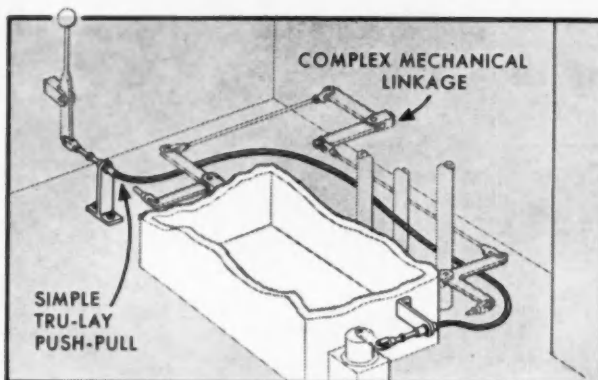
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Control Dimension	Minimum Recommended Radius in Inches	Maximum Input Load in Pounds (Dependent on Travel)
3/32"	2	30
1/8"	3	65-125
3/16"	5	115-175
1/4"	6	300-600
5/16"	8	700-1,000

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# NEWS

## FEATURES

### Services Testing Flying Saucer

The Air Force and the Army are testing a saucer-shaped flying disc designed to hover near the ground on a cushion of air or take off and fly under its own power the same as a winged aircraft.

Known as the Avrocar and produced by Avro Aircraft, Ltd., of Canada, the flying saucer began ground tests last November. Defense Dept. officials said the Avrocar has made no regular flights.

The Air Force's interest in the vehicle began in 1955 when Avro got a contract to investigate the

vertical take off and landing idea. Three years later the Army became interested and joined the Air Force in sponsoring the craft. Two Avrocars have been produced by the Canadian firm.

### 105-In. Wheelbase For Dodge Lancer

Biggest news at Dodge Div. is introduction of a compact car—the Lancer—supplementing the Dodge Dart and Dodge Polara series. The Lancer is mounted on a 105-in wheelbase chassis, features a unitized body, and has an overall

length of 188.8 in. for the four-door sedan.

Major mechanical features of the Lancer are covered in another article on Chrysler Corp. cars in this issue.

The Lancer will be available in seven body styles in two series: Lower priced "170" Series—taxi model; two-door sedan; four-door sedan; four-door station wagon; deluxe "770" Series—two-door hardtop; four-door sedan, and four-door station wagon.

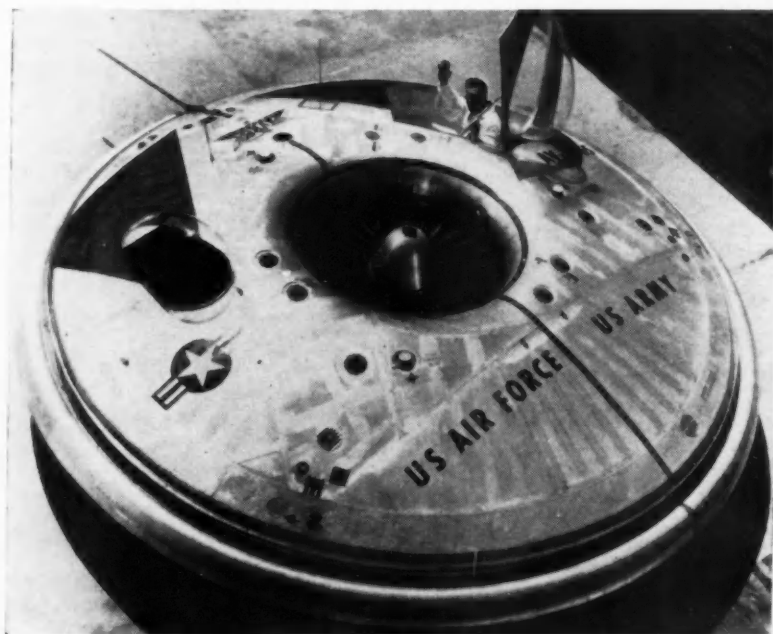
Among Lancer's optional equipment items are air conditioning; power brakes and power steering; automatic transmission; heater and radio; a choice of interiors, and flush-type instrument panel with safety padding. Optional station wagon features include Captive-Air tires; aluminum tail-gate window screen; dealer-installed, power-operated tail gate windows.

Constant-speed electric windshield wipers are standard and variable-speed wipers are optional.

At the front end, the grille, hood and bumper thrust forward in a "V." The grille is composed of fine, horizontal lines of stainless steel, extending to the sides to form a background for the dual headlamps.

### Droulard Appointed

Nelson R. Droulard, formerly research and development director of Budd Co.'s Automotive Div., has been named technical director of mechanical and nuclear engineering at Franklin Institute Laboratories, Philadelphia.



U. S. Flying Saucer Undergoing Tests

# AI TABLOID

Export regulations covering some 18 kinds of petroleum products to permit shipment to most destinations without the necessity of applying for individual export licenses have been revised by the Bureau of Foreign Commerce, U. S. Department of Commerce.

Developmental techniques, high-strength testing, neutron inspection and other subjects concerning high-test metals used in aviation construction are reported in four Air Force-sponsored research studies available to contractors and sub-contractors through the U. S. Department of Commerce.

Consumption of nickel in the United States in the first quarter of 1960 was 69.7 million lb, a 17 per cent increase over the 1959 first quarter and 64 per cent over the first quarter of 1958. The lower steel production rate in the second quarter indicates nickel consumption will show a sharp decrease.

Many of the errors in measuring thermal conductivity by conventional methods may be eliminated by using a simple, easy-to-use apparatus described in an Air Force research report on methods of purifying metals. Also available from the U. S. Department of Commerce are three other metallurgical studies concerning flexural vibrations, residual stress, and preparation of high purity metals, plus a ballistics report on magnetic inspection of projectiles by induction techniques.

Profit rates were lower in 1958 than in 1940 in 15 of 24 manufacturing industries and were higher in nine industries, the Federal Trade Commission reports. Among the industries whose profit rates were lower in 1958 than in 1957 were motor vehicles, from 15.5 per cent to 8.7 per cent and motor vehicle equipment from 10.5 to 6.1 per cent.

The National Bureau of Standards has developed a mathematical model for statistical analysis of factors involved in variability of interlaboratory test results. The method is used to distinguish between random and systematic laboratory differences that cannot be represented by constant biases.

Production of tire cord and tire fabric in 1959 amounted to 469.6 million lb compared to 387.1 million lb in 1958 and 448.7 million lb in 1957. Of the 1959 total, 296.9 million lb was rayon tire cord and tire cord fabric and 124.1 million lb was of nylon.

Research developments in nuclear physics, chemistry, electronics, plastics, metallurgy and other fields are evaluated in a two-volume review of the Third Navy Science Symposium prepared by the Office of Naval Research. The two volumes include 48 reports of Navy scientists and engineers on the progress of materials research in keeping pace with rapid advances in engineering design and weapons development.

A sharp increase in demand for jet fuel has been predicted. The 294 turbojet airliners scheduled for delivery this year will add about 1.7 billion gal to annual consumption. This estimate is based on the assumption that each craft will consume 2000 gal per hour and will fly 10 hours daily.

Development of a temperature-stable solid rocket fuel, which has been successfully fired at temperatures ranging from -85 F to 300 F, has been announced by Thiokol Chemical Corp. The new fuel is reported to be a hydrocarbon.

Nickel-chromium alloys have become standard materials in aircraft gas turbines for such vital parts as combustion chamber linings, stator and rotor blades and for after-burners.

## M&T Distributes Nickel Anodes

Metal & Thermit Corp. has been named distributor for International Nickel Co.'s nickel anode products. Metal & Thermit is a pioneer in the electroplating field dating back to the 1920's.

Harry W. Buchanan, vice president and general manager of M&T's general sales department, said "As an anode distributor, M&T is now in a position to offer complete product and service facilities to nickel platers. Our company is already a supplier of nickel salts and addition agents to the industry. Our field service laboratory is available for consultation on the application of M&T plating products and for help in solving plating problems in customer plants. Nickel anodes are in rolled carbon, depolarized and cast nickel forms."

## Parker-Hannifin Sales, Earnings Set Marks

Record sales and earnings in the fiscal year ended June 30 set records for the fourth consecutive year, Parker-Hannifin Corp. has reported.

Sales increased to \$50.7 million from the previous high of \$43.2 million in fiscal 1959. Earnings rose to \$2.8 million, or \$2.20 a share, from \$2.4 million, or \$1.90 a share in 1959, the previous high.

"The almost spectacular increase in our sales to industrial customers was especially gratifying," C. C. Sigmier, chairman, and S. B. Taylor, president, declared. "Coming on top of an appreciable increase in sales to the aircraft and missiles industries, it helped boost total sales by 17 per cent."

# NEWS

## FEATURES

CONTINUED

### Auto Show Plans Are Shaping Up

Plans for next month's 43rd National Automobile Show in Detroit are shaping up, and the Automobile Manufacturers Association, sponsor of the show, is making the usual claims about "biggest and best ever."

But the show really does shape up to be big. The exposition will run Oct. 15-23 in Detroit's new Cobo Hall, largest exhibition building of its kind in the world. AMA will use all of the building's facilities, automatically making the auto show the biggest ever.

Some 300 1961 model passenger cars and trucks will be on display. A few will make their initial appearance at the show. All U. S. passenger car companies and all major truck manufacturers will participate.

The main exhibit floor covers some 300,000 sq ft. A 350-ft stage running along one wall will feature a musical revue four times daily. Encircling the stage will be a 750-ft conveyor carrying car models.

On the river level below, a 104,000-sq ft area will be devoted to a special industries exposition called "Auto Wonderland." Some 3800 companies will participate in this show either directly or through their associations.

Five-part "Auto Wonderland" will tell the story of automobile design, engineering, research and testing; specialized vehicles; materials producers; component manufacturers; and highways, traffic safety and allied activities. The non-commercial exhibit will give stories on steel, glass, aluminum, rubber, plastics and other materials; or on bearings, wheels, transmissions, lighting, engines, etc. A design studio will be set up to design and clay-model a typical passenger car.

Cobo Hall itself will get its official dedication for the auto show, although it already has been used for several smaller conventions, including the national VFW conclave. The hall covers 10 acres along the Detroit River and includes more than 400,000 sq ft of exhibit space.

### Eaton Announces New Marine Drive

Eaton Mfg. Co. has announced it is preparing to produce a marine drive for use in conjunction with inboard engines in the pleasure boating field.

The new drive, to be known as the Powernaut, can be mounted on a variety of inboard marine engines, Eaton officials said. It combines the best features of conventional inboard engines with those of the outboard power plants, and is said to provide many additional advantages.

Advantages cited by Eaton engineers include more reliable propeller steering and easier maneuverability; improved propulsion; no mixing of oil with gasoline; greater gasoline economy; safety devices that permit the drive to "kick up" if hit by a submerged obstacle; tilting and lateral swinging for trailerizing or storage.

Another advantage is that with the new drive an inboard engine may be mounted in the stern, resulting in increased usable living area within the craft.

Eaton is demonstrating the drive to boat builders and is working closely with a number of inboard engine manufacturers in testing and tailoring the drive to their specific engines.

The Powernaut marks a step forward in Eaton's program of diversifying its product lines with lessened dependency on truck and passenger car industries to which Eaton is still one of the nation's major suppliers of parts.

F. I. Goodrich, vice president-administrative, in charge of Eaton's seven Michigan divisions, said design work on the Powernaut was instituted by the Saginaw Div. in cooperation with the Eaton Research Center in Detroit.

### MG'S LUXURY SPORTS SEDAN



The Magnette Mark III, styled by Pininfarina, has independently adjustable front bucket seats and Indian walnut instrument panel and trim.

# EUROPEAN ROUND-UP

By DAVID SCOTT • Special Correspondent

Brightest spot in the European automobile picture is West Germany, whose booming economy has formed a stable foundation for dramatic growth in car production.

**Output has increased nearly 20 times during the past decade, and this year it's expected to reach the two million mark—a third higher than in 1959.**

Such expansion is based on the high level of real purchasing power (not exaggerated by credit buying since most automobile sales are for cash), and insatiable demand for cars (there is still only one for every 15 people), and, by European standards, an outstanding national road network.

New plant capacity will raise Volkswagen's production from 3000 to 4000 vehicles daily during 1960. A survey has shown that in the past year VW leaped from 14th to eighth place (in terms of turnover) among the largest industrial corporations outside the United States, and now outranks Krupp and the British Motor Corp. in the top 10.

## New VW Thought Near

The long-awaited new and larger VW sedan is reliably believed to be scheduled for launching next year.

GM's Opel has pushed output 15 per cent above the comparable 1959 level when the year's total was 312,000 cars. It has now started building a new factory at Bochum in the Ruhr district which will boost annual capacity to 400,000 units.

German Ford, in third place, turned out 132,000 cars last year and has increased its yearly rate to 170,000. This U.S.-owned company also is seeking more space, and is currently negotiating to buy a plant site at Hamm.

A new assembly hall for Daimler Benz is slated to raise its 1960 production to some 128,000 cars, nine per cent above 1959. Despite this increase, demand for Mercedes cars still outpaces supply. Symptomatic of West German prosperity is the two-year waiting list for the luxury 220S, and 18 months for the four-cylinder models.

**Daimler Benz has further consolidated its position by a tie-up with Maybach Motorenbau, forming a new company, Industrie Motorenbau, in Stuttgart. The two firms will cooperate in the design and production of high-speed Diesel engines for industrial and tractor uses.**

Auto Union will nearly double its output this year with a total of 133,000 cars, and target for next spring is an annual rate of 150,000. This expansion is linked with the success of the small DKW Junior, and will push Auto Union into fourth place among German auto makers, displacing its parent company, Daimler Benz.

News from France is that Citroen is augmenting its main Paris factory with a new one at Rennes, following government directives for decentralization. The press shop is nearing completion and will start up by the end of this year, while the entire plant, employing 5000, will be in full operation early in 1962.

## Volvo's New Model

Elsewhere in Europe, a report from Sweden states that Volvo has begun pilot manufacture of a new cross-country vehicle. Volume production of military and civil versions is scheduled for next year, and the Swedish army has placed a large order.

Several European firms also are extending their overseas operations. Looking ahead to a Latin American common market, Citroen has purchased the Catita factory in Buenos Aires which is being converted to make 2CV cars and delivery vans.

The 1960 output of 1600 vehicles is slated to grow to 25,000 by 1965, when almost all materials and parts are of Argentine origin.

Egypt is another area for foreign investment. Klockner-Humboldt-Deutz has broadened its ties with the United Arab Republic, and has just completed construction of Egypt's first truck and bus factory, which has an annual assembly capacity of 2500 Magirus vehicles. In addition, an engine plant in Cairo has begun manufacture of Deutz air-cooled Diesels for stationary applications.

**At the same time, the Mid-east's first auto factory, privately owned by the Egyptian Automotive Co., has started turning out the 600-cc Ramses. While the integral body is made in Egypt, the engine, transmission, suspension and wheels are supplied by NSU in Germany.**

In Britain, Shell Research has developed a low-temperature fuel cell that is said to generate up to five times more power per unit volume than any known similar cell. The company has built multi-cell assemblies with a power-weight ratio approaching 50 watts per pound, and energy lost as waste heat is said to be 20-30 per cent less than with an internal combustion engine.

## Folland Hovertrucks

Folland Aircraft has revealed plans to produce a series of air-riding Hovertrucks, the first having a payload rating of five tons.

The Corvette-engined Gordon Grand Touring Car, unveiled at the Geneva motor show in March, will be in series production in England early next year. About 1000 models will be made annually. They will be aimed at the U. S. market and priced in the \$6000 bracket.

Peerless Motors has just started building a new factory at Slough, near London, while the first batch of Italian-built bodies has been ordered from Carrozzeria Bertoni.



### Air Force Orders 2 Inhaler Planes

Two experimental planes that inhale air through long, thin slots in the wings have been ordered by the Air Force.

They are seen as the forerunners of huge transports able to carry supplies to remote areas and return without refueling.

The air-inhaling system has been developed by a Northrop Corp. group headed by Dr. Werner Pfenninger. A Swiss-born scientist, he was brought to Northrop for this project in 1949.

Tests with wind tunnel models and a standard jet plane have shown that, with air inhaled through wings and tail, a plane's normal range can be increased 50 per cent. If the system is used on the fuselage as well, the normal range will be almost doubled.

Air Force sources say the two planes will have the body and controls of twin-jet B-66 bombers. The wings, slotted at top and bottom, will be much larger than B-66 wings. The two main engines will be Pratt & Whitney J-57s, much larger than B-66 engines. A third engine will be in the fuselage to provide suction for the system.

Northrop, allotted \$20 million, estimates the planes will be in flight in about two years. Tests should take about six months, engineers say.

Lt. Gen. Bernard A. Schriever, head of Air Force research, calls Dr. Pfenninger's progress to date a "real breakthrough" in efforts to increase the range of bombers without increasing their weight.

The technical name for the range-extending technique is "low-drag boundary layer control." The "boundary layer" is the thin layer of air next to the plane's wing or other surface. It flows more slowly over the plane than the normal

### REDS CLAIM WORLD'S LARGEST HELICOPTER



The MI-6 has a gross weight of 84,000 lb and is said to carry up to 80 passengers plus vehicles driven aboard through doors at rear. Two 4635-shaft-hp gas turbines assure top speed of more than 165 mph.

airstream farther away from the craft's skin.

Dr. Pfenninger says tests have shown engines consume less fuel than with turbulent airflow and the same amount of fuel will carry a plane much farther. The inhaled air can subsequently be fed into the jet engines to provide extra thrust and still more fuel saving.

### Grumman to Build Pilot Ready Rooms

Economical, mobile pilot ready rooms will be produced for the Navy by Grumman Aircraft Engineering Corp. and its subsidiary, Aerobilt Bodies, Inc., Athens, N. Y.

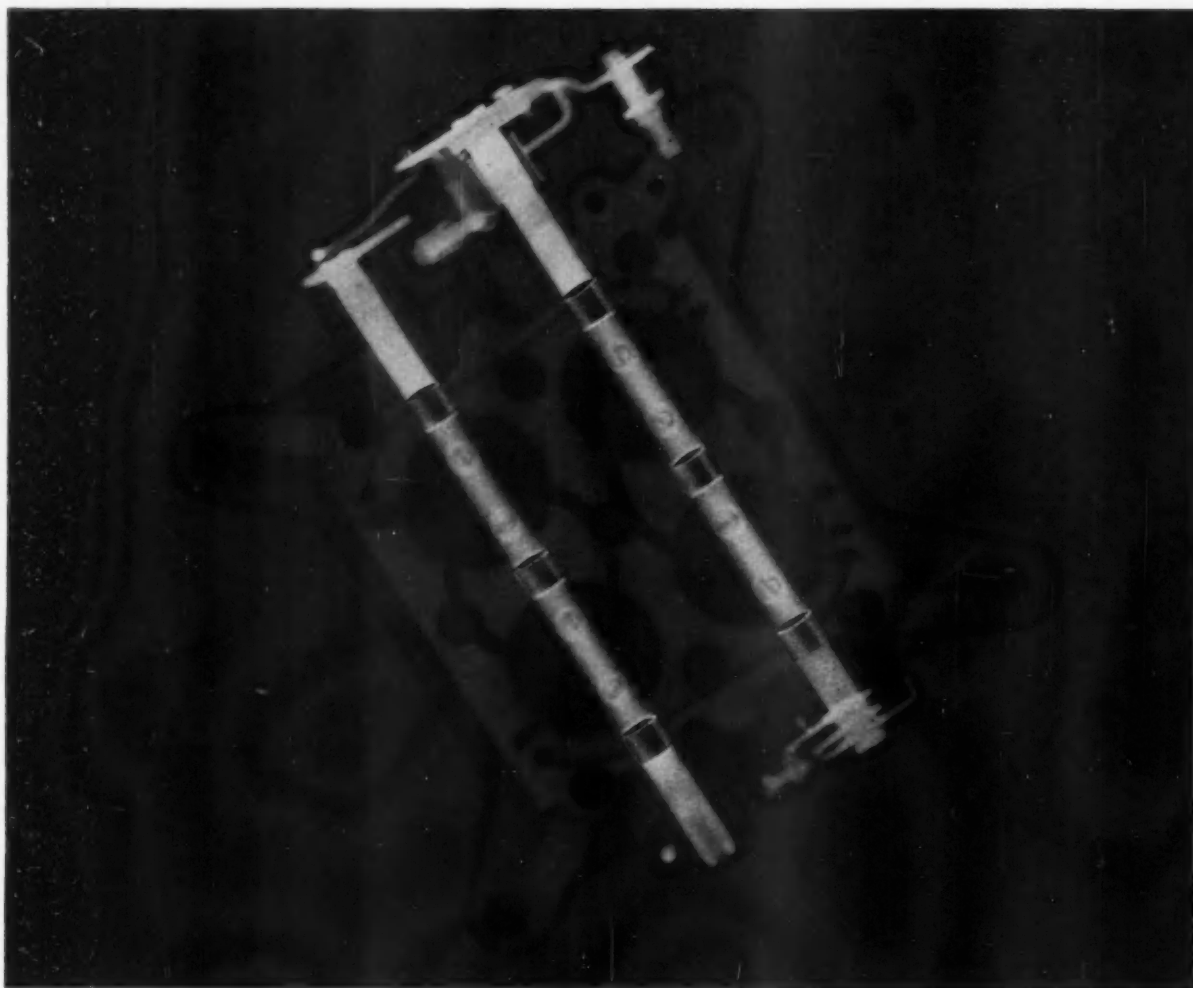
A complete ready-room facility will consist of two 40-ft trailers which can be placed side by side or back to front. Passage from the first trailer, a dressing room unit, to the second trailer, a briefing and alert room, is by connecting passages.

### \$10 Million Saved On Missile Masters

A \$10 million saving is being returned to the Army by the Martin Co. from \$95 awarded it for the Army Missile Master, an electronic missile defense co-ordinating system. The savings are the difference between actual and estimated costs.

The savings in the Missile Master contract include costs of designing, developing, fabricating and putting into operation the systems that have been or will be installed before the end of 1960 at key industrial centers throughout the U. S.

Estimated costs in 1955 indicated that installing and testing 10 Missile Master systems and additional equipment for training would require at least 1,000,000 man-hours. Actually, only 600,000 man-hours are required. An additional saving was in spare parts. Originally, it was estimated 15 per cent of spare parts would be needed. As it turned out, only half that number were found necessary.



## Bearings of TEFLON® solve stick-slip problem...cut machining costs

Sleeve bearings of TEFLON TFE-fluorocarbon resins in this diaphragm-operated four-bore carburetor facilitate free movement that is essential in opening the secondary throttle plates. Self-lubricating bearings of TEFLON prevent sticking of the shaft during acceleration . . . are not corroded by gasoline. Further, the bearings of TEFLON enabled the manufacturer to reduce the number of machining operations and cut production costs.

The exceptionally low coefficients of friction, both static and dynamic, offered by TEFLON resins frequently permit the use of dry bearings in places where lubrication is difficult or impossible. In addition, the virtually complete chemical inertness of TEFLON assures that bearings per-

form unharmed in contact with gasoline, oil, grease and automotive chemicals. And TEFLON TFE resins are rated for continuous use from -450°F. to 500°F. Bearings of TEFLON can be tailored for increased loads and velocities or high wear resistance by the use of filled compositions and reinforced constructions.

For more information about design improvements and cost savings made possible by the use of TEFLON, write to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department T-59, Room 2526, Nemours Building, Wilmington 98, Delaware.

*In Canada:* Du Pont of Canada Limited, P. O. Box 660, Montreal, Quebec.



**TEFLON®**  
FLUOROCARBON RESINS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

*TEFLON is Du Pont's registered trademark for its family of fluorocarbon resins, including TFE (tetrafluoroethylene) resins and FEP (fluorinated ethylene propylene) resin.*

# MEIN

## IN THE NEWS



*General Motors Corp., Cadillac Div.—Henry B. Brawner has been named plant engineer.*



*Divco-Wayne Corp., Divco Truck Div.—Max V. Downing has been promoted to operations manager.*



*Electric Autolite Co., Bay City Div.—Jack B. Schneider has been named manager.*



*Stewart-Warner Corp., Alemite and Instrument Div.—Jack R. Reinsma has been named manager of product programs.*



*Electric Autolite Co., Prest-O-Lite Battery Div.—Jeff Shea has been named sales manager.*



Hughes Aircraft Co.—L. James Levissee has been appointed assistant to the general manager.

Universal-Cyclops Steel Corp.—Edward E. Hall has been promoted to assistant general sales manager.

Sparton Corp., Electronics Div.—A. A. Shamah has been appointed marketing manager.

General Motors Corp., Fisher Body Div.—Martin A. Franklin has been promoted to comptroller of the Atlanta, Ga., plant.

Ford Motor Co.—Walter F. Miller has been named manager of Cleveland stamping plant and Albert J. Chendes has been appointed manager of Dearborn stamping plant.

Borg-Warner Ltd.—John R. Mueller has been promoted to general manager of English plants.

Beech Aircraft Corp.—M. J. Gordon has been promoted to manager-commercial engineering.

Tidewater Oil Co., Export Dept.—Albert H. Zinkand has been promoted to manager.

United States Rubber Co.—J. J. Orr has been appointed director of engineering.

Chrysler Corp., Chrysler and Imperial Div.—D. C. Smith has been promoted to director of dealer relations.

Dana Corp., Marion Div.—John J. Morrissey has been named manager.

Ford Motor Co., Ford Div.—Richard T. Lindgren has been promoted to assistant comptroller for distribution.

Bendix Corp.—F. J. Borheck has been appointed director-aerospace marketing and B. D. Carter has been named director-automotive marketing.

Electric Autolite Co.—Virgil E. Urbine has been named manager of quality control.

United Aircraft Corp., Sikorsky Aircraft Div.—Carlos C. Wood has been named engineering manager.

Ford Motor Co.—G. L. Lemoine, Norfolk, Va., plant manager, has retired.

*Vickers, Inc., Aero Hydraulics Div.—D. G. Wilson (far left) has been named manager of Torrance, Calif., plant and J. R. Rea has been appointed manager of Joplin, Mo. plant.*

General Electric Co.—Raymond J. Sheehan has been named manager of equipment support for the Aircraft Accessory Turbine Dept.

Fansteel Metallurgical Corp.—James E. Borendame has been appointed director of marketing and public relations.

Armstrong Cork Co.—W. Arthur Abel, assistant general purchasing agent, has retired.

American Brake Shoe Co., Electro-Alloys Div.—Roy K. Cannon has been appointed sales manager.

J. I. Case Co.—Carl vonLinsow has been appointed director of engineering-industrial products.

Perfect Circle Corp.—Donald R. Vance has been appointed supervisor of engine testing.

Ford Motor Co.—Malcolm R. Fuller has been promoted to director of Chicago Marketing Institute.

Ex-Cell-O Corp.—Earl E. Conlin has been named vice president-finance; Miles H. Knowles has been named secretary; Edward J. Giblin has been appointed treasurer, and Russell D. Hughes has been named comptroller.

Clinton Engines Corp.—Walden F. Wright has been promoted to assistant manager, engine division.

B. F. Goodrich Co.—Dr. Richard G. Bauman has been promoted to manager of tire research.

### Necrology

William H. Lyman, 83, vice president and general manager of the Hudson Motor Car Co., died Aug. 18 at Cedar Beach, Ont. Before joining Hudson he was general manager of Warner Gear Co., now Borg-Warner Corp.

Lester K. Ferris, 64, a project engineer at General Motors Technical Center, died Aug. 18 in Birmingham, Mich.

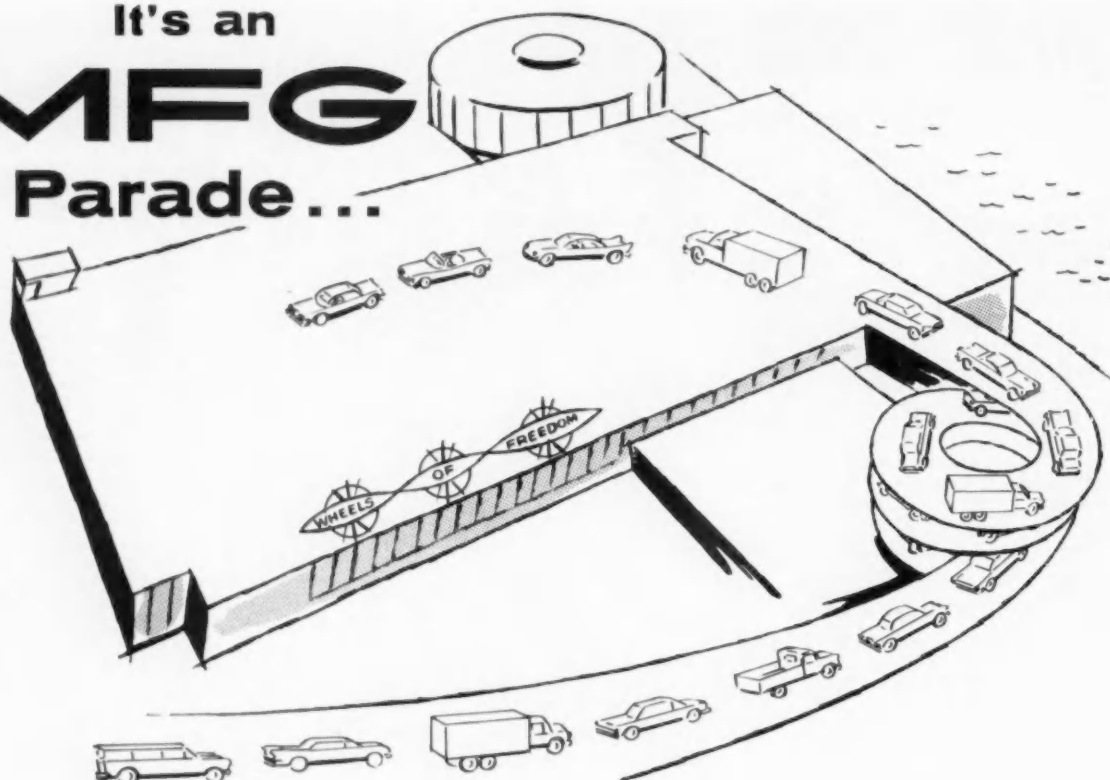
Raymond F. Jalbert, 40, a sales engineer with McLouth Steel Corp., died Aug. 18 in a plane crash near Itasca, Tex.

Orrin W. Barker, 60, retired vice president of Kearney & Trecker Corp., died Aug. 15 at Sturgeon Bay, Wis., of a heart attack.

Frederick W. Boynton, 69, retired vice president of the Murray Corp. of America, died Aug. 14 in Hale, Mich.

C. B. Coombs, 44, sales manager for O. E. M. and mobile products for the York Div., Borg-Warner Corp., died in York, Pa.

# It's an MFG Parade...



## AT NATIONAL AUTO SHOW —

## NEW COBO HALL IN DETROIT—OCTOBER 15-23, 1960

Wherever you look at the National Automobile Show, you'll see Molded Fiber Glass parts on cars and trucks! Specifically, ten different manufacturers are using MFG parts on 21 models of 1961 vehicles.

WHY this growing popularity of Molded Fiber Glass? Here's why:

- **Reduced weight**—approximately 40% less.
- **Fast tooling time**—new models a year sooner by tooling up faster, cheaper, better.
- **Large complex moldings**—for less cost, fewer pieces, eliminate assembly problems and possibility of squeaks.

MOLDED FIBER GLASS is exceptionally strong; impact resistant; rust-proof and impervious to salt and other road chemicals; warm in winter; cool in summer; *quiet!*

You deserve the full story. Learn how you can speed production, save money, make a better product with MFG. Write for details.



## MOLDED FIBER GLASS BODY COMPANY

4611 Benefit Avenue — Ashtabula, Ohio



an Editorial



## The Curtain Rises on '61

**F**OR 60 DAYS AHEAD, the biggest show of the year opens in a wide range of locations. The 1961 models described partially in publication pre-view and advance stories will be presented in both the industry's own National Automobile Show in Detroit, as well as in other showings throughout the country by individual manufacturers and dealers. These models, which represent a great array of original engineering, styling, design and manufacturing innovations, will be the foundation stones for another model year in which experts now predict sales of more than 6,500,000. The possibility that 1961 sales will exceed 1960 by a considerable margin is quite substantial.

THE NEW MODELS from year to year have provided the basis on which a growth of the industry has occurred, exceeding popular estimates. During the 10 year period from 1950 through 1960, this aspect of solid and steady growth is clearly apparent. It is not equally apparent from data used in shorter term studies. Data for the decade prove very substantially that the automobile manufacturing and related fields are actually America's largest and most reliable growth industries.

THE ECONOMIC PERFORMANCE of a group of nine major automotive producers (passenger cars and trucks) was analyzed. The following data appeared. For the 10 year period 1950-1960, only two companies showed a decline in the median market price of their stock. Seven showed advances. The high in gain per share was 466 per cent, the greatest loss per share 60 per cent. The average gain for the holder of equal shares in each of the nine companies was 73 per cent on his investment.

THE MOST IMPORTANT FACTS, however, are those which graphically show the economic growth of the companies. During the 10-year period, the average rise in working capital was 114 per cent. The highest gain was 360 per cent. The only decline was 3.3 per cent. The book value per share for the 10 year period increased 66 per cent for the group average. The highest gain was 130 per cent. The greatest decline was 58 per cent for one company. The average increase in gross sales per company for the 10-year period was 106 per cent. The highest increase in gross sales for any one company was 201 per cent. All showed gains in gross sales, there were no declines. This spectacular growth record was made without governmental subsidies and pampering. It was achieved despite a fantastic burden of taxes. It illustrates the basic fact that growth is the most outstanding characteristic of these industries. The growth aspect has repeated itself decade after decade and can be expected to repeat itself again.

AS THE "BIG SHOW OF 1961 NEW MODELS" approaches, perhaps all of us can add more impact and meaning to the presentation of the individual model lines by using some of these background facts to emphasize that 1961 will bring more net growth to total automotive production.

THIS IS THE MOST IMPORTANT and basic fact in the whole show. Within this framework, there is much rivalry and intense competition. But the total effect of the competition is—more service and value for Mr. & Mrs. America, more economic value more widely produced and shared four ways; among employees, among vehicle users, among industry suppliers and among financial investors.

*Henry W. Barclay*  
Editor and Publisher

**A  
SHORT STORY  
ABOUT SPRINGS**

A **BURTON** coil spring



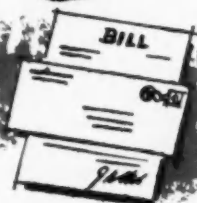
or a **BURTON** leaf spring



brings continued smiles  
from drivers



and fewer bills  
for maintenance



ask White, Mack, Diamond T, Dodge, Studebaker, Reo or Fruehauf

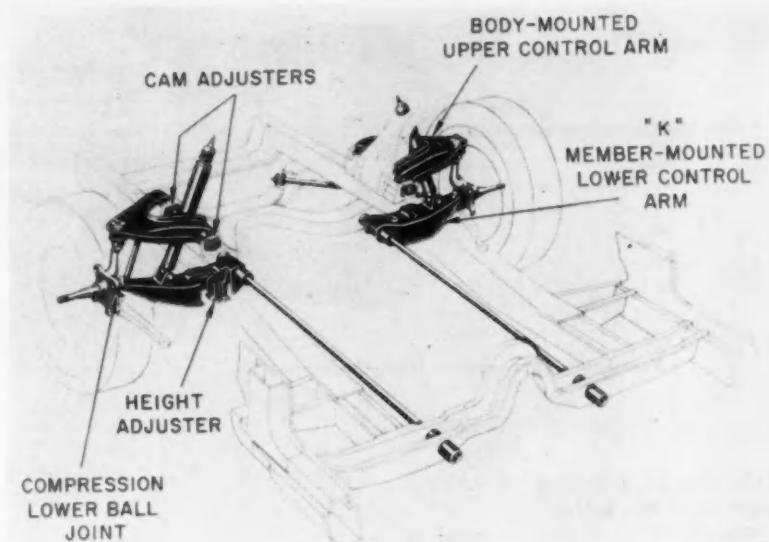
*...or ask us...we've been engineering top quality springs since 1923*

 **BURTON** Auto Spring Corporation

WESTERN AVENUE AT 48TH STREET • CHICAGO 32, ILLINOIS

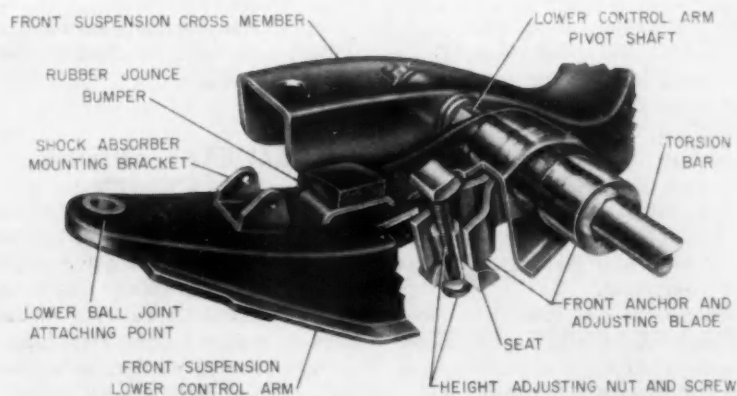
Circle 134 on Inquiry Card for more data

By  
**Joseph Geschelin**  
DETROIT EDITOR



*Front suspension components*

## Mechanical Features of the Chrysler Line for 1961



*Front suspension height adjustment*

**W**HAT'S new at Chrysler for 1961? This round-up of engineering features is based upon material released by Chrysler Corp. at the Miami Beach preview, held this year September 6 to 8. It follows our practice of the past few years of summarizing

the basic mechanical features for all divisions.

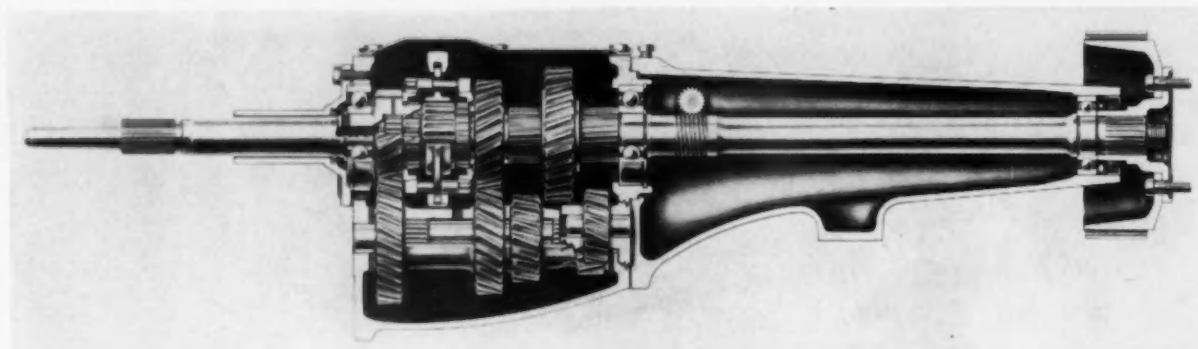
With the introduction of the Dodge Lancer, mounted on a wheelbase of 106.5-in., Chrysler Corp. boasts two compacts—Valiant and Lancer, both employing substantially the same chassis; the Dodge

Dart—mounted on 118-in. wheelbase, fitting between the small cars and the larger cars; and a full line of cars in Plymouth, Dodge, DeSoto, Chrysler, and Imperial.

News in the Chrysler division is the introduction of the Newport series, a line of full-sized cars in a lower priced range. The line overall includes the Newport, Windsor, New Yorker, 300 G, and Imperial.

Perhaps the major feature of the entire 1961 family is the fresh exterior and interior styling of all lines. It is beautiful and distinctive—and that is about all we can say at this time since illustrations cannot be used at this writing. All lines have unitized bodies, except, Imperial which retains the body of last year with new rear quarter panels. It may be emphasized at this point that DeSoto is very much in evidence, despite the usual rumor-mill.

The family of engines remains basically the same, except for cer-



*New heavy-duty manual transmission*

tain details described in another section of this article.

Torsion-Aire suspension remains basically the same. Other details of the chassis are described in another section.

One major feature, introduced two years ago and refined last year, has been dropped on some lines. We refer to the swivel seat option which appear only on Chrysler and Imperial in 1961.

Chrysler, now in full swing in the design and manufacture of electrical components, supplies the AC alternator across the board on all passenger cars. There is also a new distributor and solenoid-actuated starting motor.

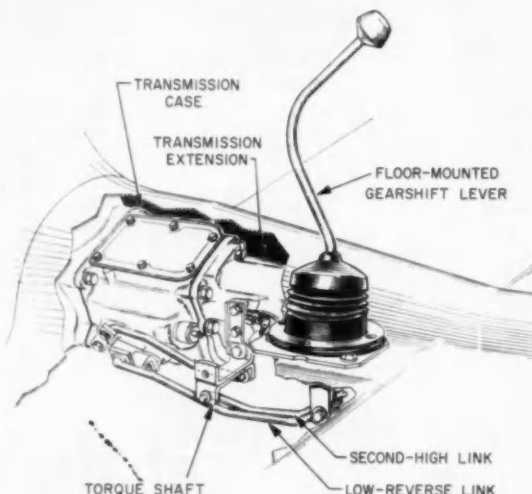
Highlighting the Dodge truck line is the newly introduced Dart pick-up, offered in two wheelbases—114-in. and 122-in. Complete details of this unique vehicle are given in a later section.

Due to the way release dates break this year, we are permitted to describe the lineup of models for only one division—Dodge. For 1961 this includes the Lancer on a wheelbase of 106.5-in.; Dart on a wheelbase of 118-in.; and Dodge Polara models on 122-in. wheelbase. The complete line of body models encompassed in the Dodge Division is given in the table, shown elsewhere in this article. Incidentally, the overall lengths of the various 4-door sedans in this division are: 188.8-in. for Lancer; 209.4-in. for the Dart; and 212.4-in. for Polara models.

Constructional details of the family of unitized bodies were covered in considerable detail last year. Without going into further detail, it may be noted that corrosion pro-

## MANUAL TRANSMISSIONS

*Valiant manual transmission*



tection has been given some additional attention with two steps added for 1961 production. Prior to dipping in the water soluble primer, a special spray of the primer is applied to the inside of door sills while the body is hot. The second step comes after the final baking stage. Here the inside surfaces of door sills are given a final coat of high melting point wax type compound.

Among the novelties introduced this year on Imperial and Chrysler models is an electric push-button-operated windshield washer system, with power supplied by an electrically-driven positive displacement pump. It sends four high-pressure jets of fluid against the glass.

Also featured in the line is a gearless drive speedometer, featuring a magnetic drive. It consists essentially of a cable-driven, 12-pole, annular ceramic magnet with temperature compensation, a flux collector, a drum-type indicator with a stationary, non-metallic

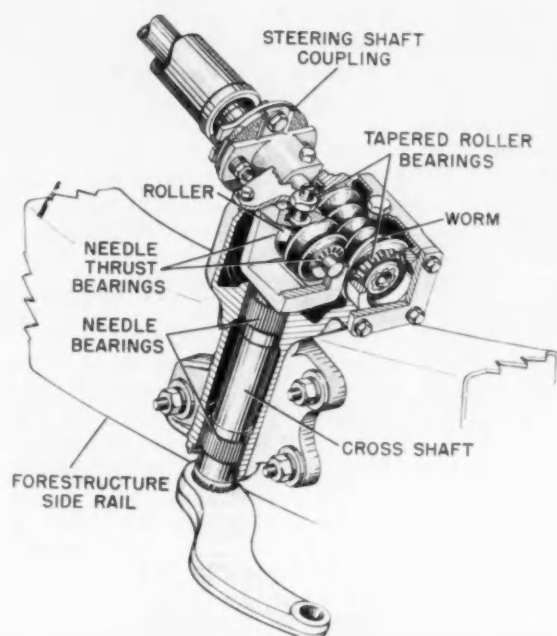
bearing, an eddy-current disk, and a calibration mechanism. This device is found only on Plymouth and Imperial models.

## GENERAL ENGINE FEATURES

All engines will have the optional closed crankcase ventilation system for use on the West Coast and other regions where it is mandatory to reduce engine emissions.

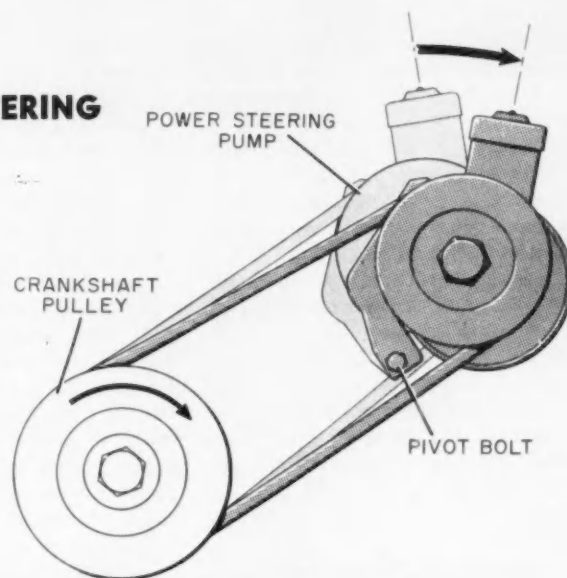
As indicated earlier, all engines in the Chrysler family are equipped with an a-c alternator, instead of the conventional d-c generator. This feature first became available on the Valiant and Imperial last year. In addition, all V-8 engines are equipped with a solenoid-shift starter. Too, there is the Chrysler-built distributor, having a die-cast aluminum housing and a new breaker point assembly, employing nylon to decrease the weight of the moving arm as well as to minimize





Low-friction manual steering gear

## STEERING



Self-tightening power steering pump drive

friction between the cam and follower block. Points are prepared as an assembly to assure alignment.

For improved fuel economy, there are two carburetor revisions on V-8 engines. First is a two-stage step-up jet which gives smoother part throttle operation and better mixture control. In addition, float needles are tipped with a high grade synthetic rubber. By virtue of the resiliency and sealing ability of this tip, it is expected that most troubles due to carburetor flooding caused by dirt between the needle valve and seat will be eliminated.

On Slant Six engines, low-speed performance and economy are im-

proved by revised calibration of choke and carburetor.

A cast iron intake manifold on the Slant Six replaces the cast aluminum manifold used last year but remains of the same design.

Another change of the Six is a reduction in compression ratio to 8.2 to 1, to provide for better tolerance to lower fuel octane ratings. This change is effected by increasing the height of the cylinder bank by 0.025 in.

Except for significant changes noted above and at other appropriate points, the entire Chrysler family of engines remains substantially unchanged in basic specifications.

## CHRYSLER ENGINE FAMILY

Two Slant Six engines are offered this year—170-cu in. and 225-cu in.—as was the case last year, the basic detail changes being noted above.

However, this year, the 170-cu in. engine will be found in the Valiant and Lancer; also as an option on the new Dodge Dart half-ton pick-up.

The 225-cu in. engine is standard on Plymouth, Dodge Dart (except Phoenix convertible) and Dodge Dart pick-up; and is available on the Plymouth Fury.

Chief exception is found in the

## 1961 CHRYSLER CORPORATION ENGINES

	Valiant Lancer**	Lancer (6)* Plymouth Dart Plymouth Fury	Fury V-800 Dart V-8	Fury Super Pak Dart V-8	Dodge DeSoto Newport	Dart V-8	Windsor	Dodge Dart (Police)***	Dart V-8 Plymouth- Dodge	New Yorker Imperial	Chrysler 300G
Displacement Type	170-cu in. Slant Six	225-cu in. Slant Six	318-cu in. V-8	318-cu in. V-8	361-cu in. V-8	361-cu in. V-8	383-cu in. V-8	383-cu in. V-8	383-cu in. V-8	413-cu in. V-8	413-cu in. V-8
Carburetor	Single	Single	2-bbl	4-bbl	2-bbl	4-bbl	2-bbl	4-bbl	Ram Induc. 2, 4-bbl	4-bbl	Ram Induc.
Compression Ratio	8.2	8.2	9	9	9	9	10	10	10	10	18
Bhp (max.)	101 @ 4400	145 @ 4000	230 @ 4400	260 @ 4400	265 @ 4400	305 @ 4800	305 @ 4800	325 @ 4600	330 @ 4800	350 @ 4600	375 @ 5000
Torque (lb ft) max.	155 @ 2400	215 @ 2800	340 @ 2400	345 @ 2800	380 @ 2400	395 @ 3000	410 @ 2400	425 @ 2800	460 @ 2800	470 @ 2800	495 @ 2800

NOTE: All compression ratio engines, except 10 to 1, use regular fuel.

All 10 to 1 compression ratio engines use premium fuel.

\* Available in late Fall.

\*\* A 4-bbl, dealer-installed package is available.

\*\*\* Bhp (max.) 325 @ 4800  
Torque 425 @ 3200

383-cu in. engine. Last year it had a bore of 4.03-in., stroke of 3.75-in. For 1961 the displacement remains the same but the bore is increased to 4.25-in. while the stroke is reduced to 3.38-in. It will be noted that the stroke of the 383-cu in. engine now is the same as for the 361-cu in. engine.

Ram induction, fully described last year and continuing with two, four-barrel carburetors, is made available for 1961. It is offered as an option only on selected models of the various divisions as follows: Plymouth Fury 383-cu in.; Dodge Dart and Dodge Polara 383-cu in.; Chrysler 300 G, 413-cu in. Ram induction is not offered on DeSoto this year.

Taking each division separately, this is the engine set-up:

**PLYMOUTH** — 225-cu in. Six, standard; Fury V-800—318-cu in. V-8 with compression ratio of 9 to 1, and two-barrel carburetor; Fury V-800 with Super Pak—318-cu in. with compression ratio of 9 to 1, four barrel carburetor; Golden Commando—361-cu in., with compression ratio of 9 to 1, four barrel carburetor; Ram Induction—383-cu in., with compression ra-

tio of 10 to 1, and two, four-barrel carburetors.

**DODGE DART SIX**—225 cu in. Six, standard Dart V-8—318-cu in. engine, with 9 to 1 compression ratio, and two-barrel carburetor is standard equipment, uses regular fuel. The four-barrel carburetor version is available as an option, with 9 to 1 compression ratio. Optional, too, is the 361-cu in. V-8 with compression ratio of 9 to 1 and four-barrel carburetor, operating on regular fuel. In addition, the 383-cu in. ram induction V-8 is available as an option, fitted with two, four-barrel carburetors. This engine carries a dual exhaust system, special camshaft, and valve spring dampers.

**DODGE**—V-8 engines only. 361-cu in. with 9 to 1 compression ratio, two-barrel carburetor, regular fuel—standard; and two optional premium fuel V-8's; 383-cu in. with 10 to 1 compression ratio, four-barrel carburetor; 383-cu in. Ram induction on Polara.

**DESOTO** — Offers just one standard engine—361-cu in. V-8 with 9 to 1 compression ratio, regular fuel, two-barrel carburetor.

**CHRYSLER**—The Newport series

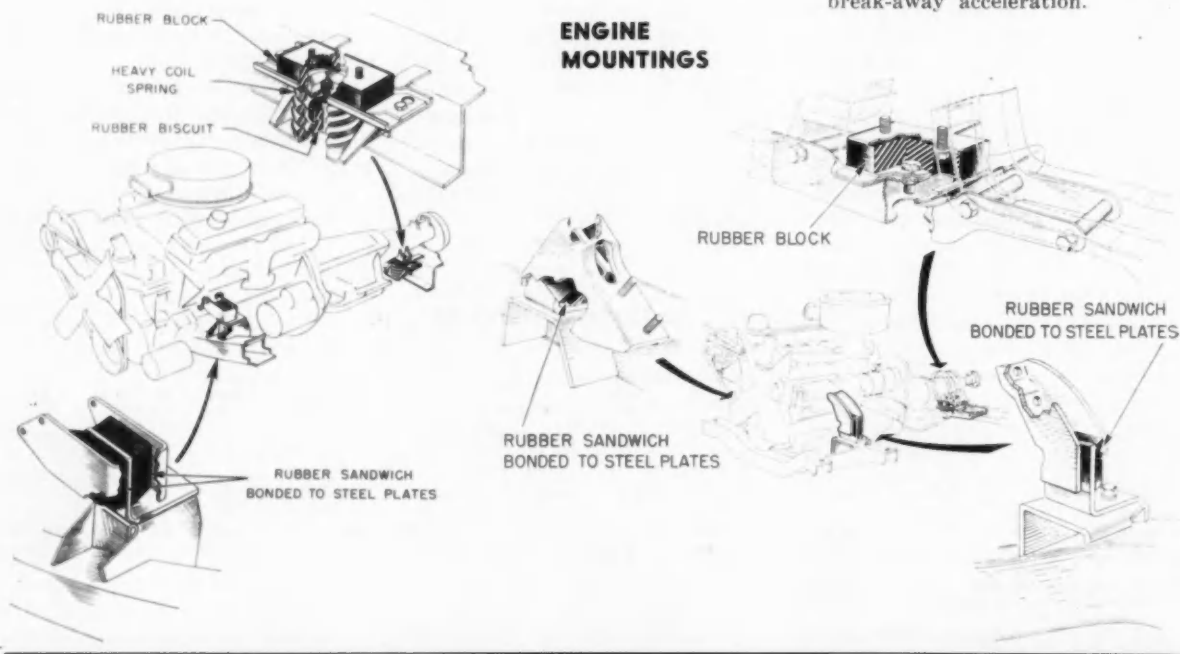
has the 361-cu in. V-8 standard. Windsor is fitted with the 383-cu in. engine with 10 to 1 compression ratio; Imperial and New Yorker have the 413-cu in. engine with 10 to 1 compression ratio. The Chrysler 300 G has the 413-cu in. ram induction engine.

## CHASSIS DETAILS

A heavy duty manual transmission is offered as standard equipment on high performance Fury V-8's, and Dodge 361-cu in. and 383-cu in. V-8's as well as in heavy duty taxi packages. It features all-helical gears, synchronized in second and high, with the following ratios: 2.55, low; 1.49, second; 3.34, reverse. Cast iron is employed for the transmission case, clutch housing, and extension. On the Plymouth Ram Induction engine, and Dodge 383-cu in. engine, the clutch is 11-in. On the other engines, the standard clutch is 10½-in.

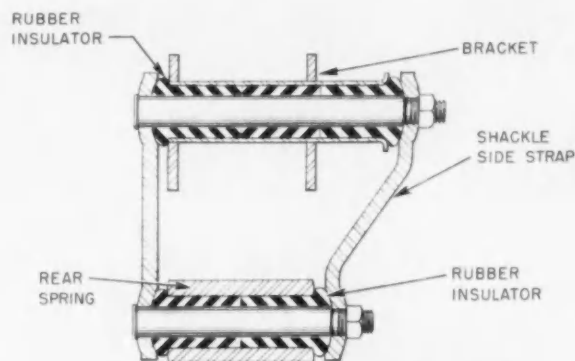
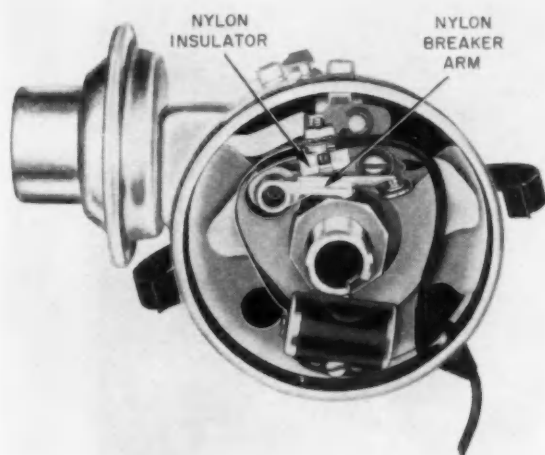
This transmission also is standard on DeSoto, and Chrysler Newport and Windsor models. A feature of the manual transmission is the use of the straight stick shift lever.

The manual transmission for six-cylinder engines has new gear ratios of 2.71 and 1.83 to improve break-away acceleration.



New V-8 engine mountings

Engine mountings on six cylinder engine



Wide-span shackle for station wagons

◀ Chrysler-built distributor

A light weight manual transmission for use with the 318-cu in. engine on the Plymouth and Dart has a one-piece cast iron case, blocker-ring synchronizers, and short, stiff shafts. Gear ratios are: 2.12 low, 1.43 second, 2.73 reverse. Gears are shot-peened to handle the higher torque loading.

In the suspension system, both six-cylinder Plymouths and Dodge Darts have five rear spring leaves (four last year). In addition, the Oriflow shock absorbers have been redesigned for quieter operation. The seat of the base valve is narrower and grooves more shallow to reduce the hydraulic forces required for valve opening.

Plymouth, Dodge, Dodge Dart, DeSoto, and Chrysler manual steering now has a fabric-reinforced rubber coupling between the steering gear and shaft to serve as a universal joint, accommodating for variations in alignment. In addition to the needle-bearing cross shaft used last year, the manual gear has needle thrust bearing on both ends of the cross shaft roller.

The power steering pump on 361- and 383-cu in. engines has a self-tightening drive which increases belt tension as pump drive torque increases. The pump pivots freely on the mounting bracket in such fashion that when the engine is stopped, only the weight of the pump pulls against the belt. Since a high initial belt tension is no longer necessary, bearing loads are decreased and belt life is lengthened.

Rear brakes of Plymouth, Dodge,

and Dodge Dart are equipped with Cycleweld linings.

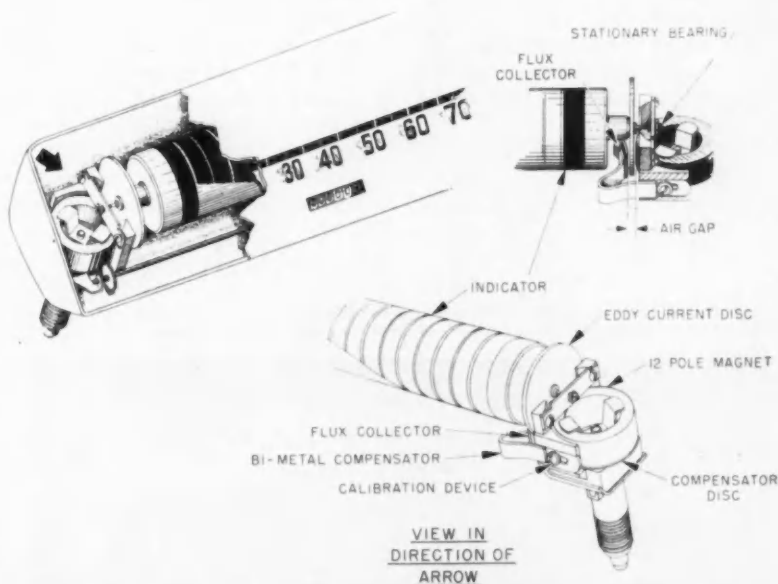
Following last year's pattern, Chrysler has three basic automatic drives available—PowerFlite (V-8), TorqueFlite (Six), and TorqueFlite (V18). Manual transmissions are standard equipment on all models except Imperial.

Valiant and Lancer, as well as Dart Six and Plymouth six-cylinder models, offer the light-weight TorqueFlite as optional equipment. For the V-8 models in the Plymouth line, there is an option of the PowerFlite (V-8), and TorqueFlite (V-8). Dodge offers TorqueFlite

(V-8) on all V-8 models; PowerFlite on all V-8's, except the Ram induction engine model. TorqueFlite is standard, however, on cars specified with 318-cu in. V-8 equipped with Power Pak. DeSoto, too, offers automatic drive as optional equipment.

On the Chrysler division line, TorqueFlite is standard on the New Yorker and Imperial; optional on Newport and Windsor.

We are also able to supply some additional details on the Dodge Polara. According to Dodge, this series is offered as a luxury car at  
(Turn to page 100, please)



Gearless speedometer drive

# New Overhead Valve Engine for 1961 Studebaker ...LARK...



*General view of the new and more powerful engine for Lark Six 1961 models. The overhead valve power plant develops 112 hp at 4500 rpm.*

**B**IGGEST news at Studebaker this year is the introduction of an entirely new overhead valve Six, replacing the L-head Six which has been used up to now. This new type of engine has been tailored to fit approximately the same mounting dimensions and to utilize some of the same parts used on the L-head engine. Because the OHV model has the same bore and stroke as did the L-head version, some people have speculated that this is not a new engine. This announcement will set the record straight.

The OHV engine, of 3-in. bore, 4-in. stroke, and 170-cu in. displacement, develops 112-bhp at 4500-

rpm, compared with 90-bhp for the old engine. Torque is 154 lb/ft at 2000 rpm.

As illustrated, the OHV Six is completely new. Cylinder blocks and heads not only are different but they require new pattern equipment. The intake manifold too is different. Of ram type, with long branches, it has larger passages to permit greater air flow. The crankshaft is a different forging, featuring a larger center counterbalance and full counterweights.

The camshaft is new, patterned after the design of the V-8 camshaft. It has low ramp, low acceleration cams which are designed to pick up valve clearance more slowly,

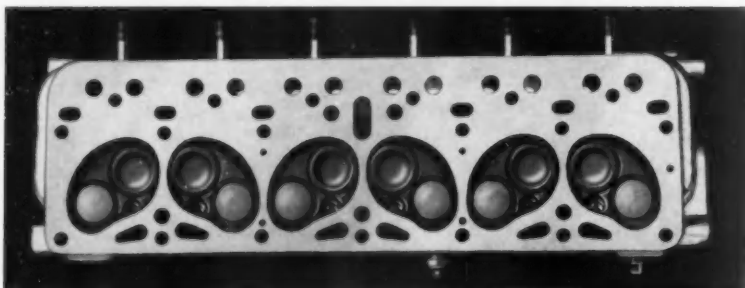
thereby reducing noise. This also permits use of relatively light valve springs, thus prolonging the life of the valve train. Mechanical valve lifters are employed. Another important feature of cam design is the virtual elimination of galling.

Oil pump capacity has been increased through use of a larger oil pump, fitted with spur gears made of sintered iron. Connecting rods, main and rod bearings, as well as cover parts such as the oilpan and timing gear cover remain unchanged. Pistons too are of the same size and design but have a looser fit in the bore, thus preventing interchangeability.

Another feature is the adoption of timing gears, replacing the timing chain drive.

Referring to the cross section of the engine, it will be seen that combustion chamber geometry is unconventional. As shown in another illustration, the combustion chamber is of kidney-shape to accommodate larger valves: intake—1-19/32-in., exhaust—1-13/32-in. diameter. The combustion chamber

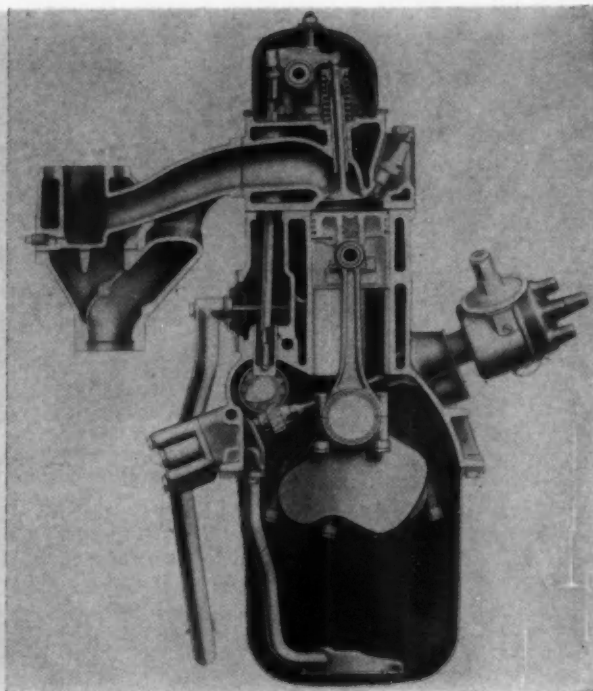
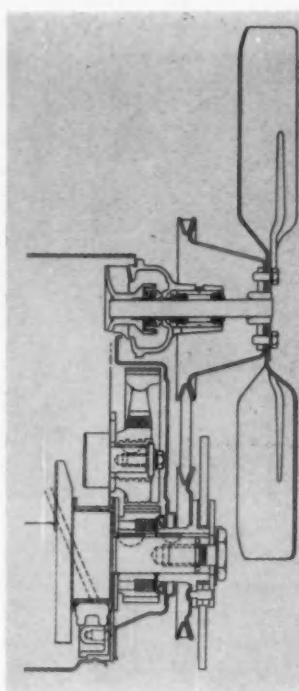
*View of the bottom of the cylinder head showing the kidney-shaped combustion chambers and staggered arrangement of the valves.*





Drawing gives cross-section of new timing gears, etc.

Photograph gives cross-section of new Studebaker Lark six-cylinder OHV engine. Inlet ports measure 1.875 inches, resulting in a 46 per cent increase in the port area over the previous power plant. The passages in head and carburetor throat are 55 per cent larger.



has ample quench area for smooth operation and reduced detonation noise. Valve materials are the same as for the V-8: intake—SAE 8645, exhaust—SAE 2112-M.

Spark plugs are centrally located in the combustion chamber and are readily accessible for servicing. Studebaker uses 14-mm Champion plugs, type H-14-Y. Compression ratio is 8.5 to 1, permitting excellent operation with regular fuel.

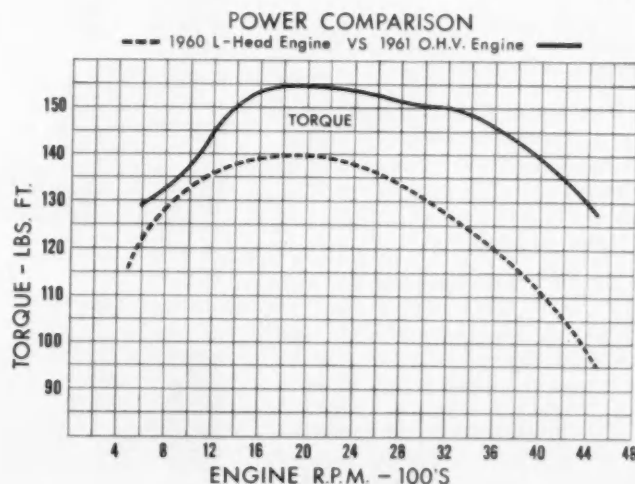
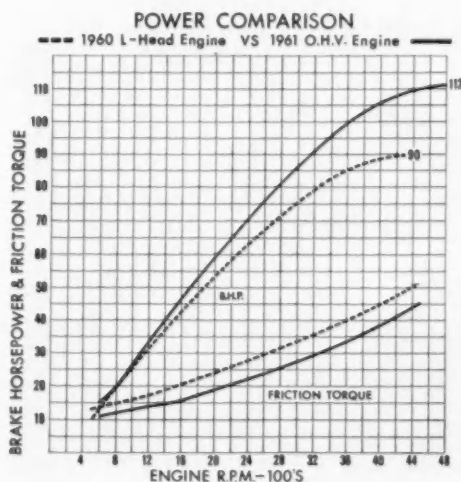
The standard carburetor is of

single-barrel type, and has a 1-5/16-in. venturi. For fleet and taxicab use the carburetor is of smaller size with 1 1/8-in. venturi.

As to other features: the fuel filter now is mounted on the pressure side of the fuel pump; a new starting motor with Bendix follow-through mechanism; and a larger clutch—9 1/8-in. size, compared with 8-in. last year. The new clutch is fitted with a 6-spring damper plate.

Engine mounting is the same as before, employing butyl mounts. Other standard items include—combination air cleaners and silencers, and automatic choke. All Larks destined for California delivery will be fitted with the closed crankcase ventilation system, also available on special order for any other customers.

It may be emphasized at this point that every element of the OHV Six has been designed to



follow the time-tried features of the V-8.

Some chassis features, associated with the drive line, also have been released at this time.

Larks are supplied with manual shift transmission standard, and overdrive optional. The optional automatic transmission for 1961 has been greatly improved by the introduction of a new torque converter, featuring a one-way clutch to provide smoother shifts. An under-hood oil filler tube will be supplied with the automatic transmission option.

Larks are equipped with the Saginaw recirculating-ball-nut type manual steering gear. And for the first time, power steering is made available.

Also of interest is the fact that



**Smog-reducing device which will be on all 1961 Studebaker cars destined for California delivery.**

this engine requires considerable new tooling, including the acquisition

of a number of new machine tools. ■

## **Cab-Before-Engine On Bedford Trucks**

Cab-before-engine Bedford TK trucks, GM-built in Britain, has the power plant mounted behind the front axle, reached through hinged side panels. This gives easy all-over access to the engine and permits maintenance in an uncramped position.

Resulting from this unusual design the three-man forward-control cab has an entrance step only 19.5 to 22 in. high) depending on tire size), a flat walk-through floor, unencumbered by bulges, and a wide windshield that extends down to knee level so that the driver can see the road only seven ft ahead.

Deep vent panels in the side windows also improve close-in vision. In addition, placing the engine in a separate compartment keeps the cab cooler and quieter, and free of oil and grease.

The TK range comprises 12 truck and tractor models from four- to 12-ton payload ratings with optional gasoline or Diesel engines of six types from 214 to 350 cu in.

One of the chassis innovations is a three-way safeguard against brake failure: a tandem master cylinder which isolates the front

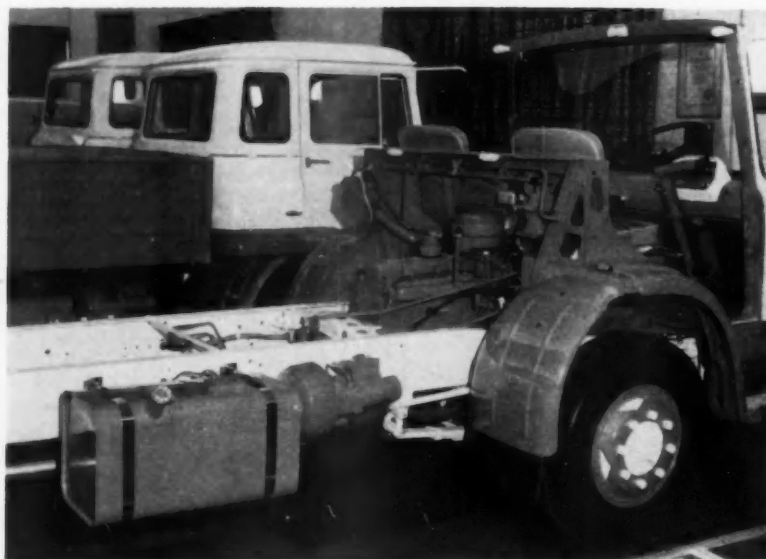
brakes from the rear in the event of a fluid leak, direct connection at all times between the pedal and hydraulic system, and a completely independent mechanical handbrake.

Servo assistance is by vacuum on the gas-engined models and pneumatic on the Diesels. Both servo units occupy the same space, and

have many parts in common. Front-to-rear brake ratio is 50/50.

The handbrake operates on the transmission, with a Lockheed disk used on vehicles over seven tons. Low loading height is obtained by employing 16-in. wheels on trucks up to five tons and 20 in. on heavier ones.

### **BEDFORD TK FEATURES CAB-BEFORE-ENGINE**



### 1961 Comet Engines—6-cyl inline, OHV

	Standard	Optional
Bore (in.)	3.50	3.50
Stroke (in.)	2.50	2.94
Displacement (cu in.)	144.3	170
Compression Ratio	8.7	8.7
Bhp (max.)	85 @ 4200 rpm	101 @ 4400 rpm
Torque (lb ft) max	134 @ 2000 rpm	156 @ 2400 rpm
Carburetor	Single, downdraft	
Fuel	Regular	



Comet 1961, two-door sedan

## Comet for 1961 Offers 101 Hp Engine

**R**EFLECTING the marketing experience of last year, the 1961 Comet line, produced by Lincoln-Mercury Division, will feature substantially the same styling as before. Body styles are the same: two-door and four-door sedans on 114-in. wheelbase; and two-door and four-door station wagons mounted on a 109.5-in. wheelbase chassis.

The big news is the availability of an optional 170-cu in. engine (RPO) to supplement the standard 144.3-cu in. engine. Both engines are fitted with automatic choke as standard equipment.

In addition to the new engine, the Comet also has a number of improvements. One new feature is the use of pre-lubricated threaded metal bushings in the upper arm pivots, replacing the rubber bushings used last year. The rear leaf spring has controlled for-and-aft movement, achieved through the

use of a two-inch rubber front eye bushing.

The manual three-speed transmission has been modified to accommodate the increased torque of the optional engine. The two-speed automatic transmission is the same as it was last year. However, when this transmission is specified in combination with the 170-cu in. engine, it is provided with water-cooling.

As will be evident from the tabular data, the 170-cu in. engine has the same bore as the basic 144.3-cu in. engine, the major difference being in the use of a longer stroke. Thus while the block and other structural parts are the same, the large version exhibits numerous differences in components. For example, the crank-shaft is new and connecting rods are shorter. The cylinder head has a different combustion chamber, including intake valves of larger diameter. The car-

buretor is of larger capacity with revised venturi and calibration. Distributor calibration too is revised.

Compression height of the pistons is reduced, thus making another item that is not interchangeable, despite the fact that the bore is the same. Engine main bearings are different. In addition, this engine takes a 15-in. fan.

Besides the changes in engine components, other elements are modified to suit the larger engine. The rear axle has new pinion and drive gears and the radiator has more fins per inch. It is fitted with a heat exchanger in the lower tank for transmission oil cooling when the owner specifies the 170-cu in. engine with automatic drive.

Several modifications apply to both engines. The front cover now is of die-cast aluminum, and vertical ribs are added to the oil pan for

(Turn to page 101, please)



**Chevrolet heavy-duty dump truck features individually suspended front wheels, variable rate rear springs and Hendrickson tandem drive system.**

**With four-wheel drive, dual rear wheels and 9000 lb GVW, the Willys FC-170 can reportedly tackle 65 per cent grades with full rated payload. Removable engine covers located between the seats provide access to major engine components.**



# A Look at OFF-HIGHWAY TRUCKS

**By Norman M. Lloyd**

MARKETS EDITOR

## Producers and Users Share Driver's Seat in Vehicle Design

**O**FF-HIGHWAY trucks are star performers, . . . their stamina developed from the monotony of oft-repeated tasks. Hauling everything from asphalt to zinc ore, they work "all out, all day." To do the job and remain competitive, however, still more material has to be hauled, at greater speeds and with greater efficiency. This fact has moved manufacturers closer to the users in a strong bid to anticipate changes in the direction of equipment design (what the operator needs, and what he will buy) and to keep the market humming.

With the ever increasing profit squeeze and the "battle for bids," downtime for repairs is not on the contractor's timetable. Designers are compelled to strive for increased

performance in terms of speed, power and capacity without "gadgets." This has not been an easy task. If performance is emphasized over reliability, the usefulness of the machine to the user often turns out far less than specified, or expected.

**Reliability** — As the familiar saying goes, "A little neglect may breed mischief: for want of a nail the shoe was lost; for want of a shoe the horse was lost; for want of a horse the rider was lost." Designers know that the reliability of a product or assembly does not equal the average, but the product of reliabilities of the component. Therefore, complexity is the major cause of unreliability. In striving for increased performance, how-

ever, engineers are often met with increased complexity and are faced with the dilemma of which to emphasize—performance or reliability.

Manufacturers, conscious of the growing criterion of high reliability, are attacking this problem on two fronts, . . . decreasing the number of parts, where possible, and increasing the reliability of each component. The major offensive, though, will undoubtedly have to be waged with components and systems of simpler design.

For off-highway trucks, reliability is measured by (1) the job to be done, (2) the load involved, and (3) the ability to withstand the environment.

Although materials, parts and



designs have vastly improved, users feel that producers should do more field testing on their own rather than "let" the contractor prove the equipment and assume the responsibility for downtime and the costs for replacement and repair.

The time-honored practice of shaking the bugs out in the field has done much in discovering hidden weaknesses and establishing "predictables." In some instances, bugs are not only shaken out, but are also shaken in, providing the manufacturer with a record of "infant mortality" for new parts and components.

- larger and stronger bolts are needed on the flywheel housing
- automatic engine shut-off is needed that will operate when the engine becomes too hot or oil pressure too low
- frames and chassis should be stronger; when loaded by large machines (six or eight yd), off-highway dump units cannot support loads. More metal is needed in the top and bottom flanges of the chassis at points of maximum positive and negative bending moments. Additional reinforcement is also needed in the web

of the chassis members at points of maximum torsion and stress. Stress frequently builds up right at the spring hangers.

- there is strong interest in the development of self-cleaning bodies; systems using exhaust heat are not positive on the short haul
- transmissions on large units should incorporate a device that prevents the operator from over-shifting
- all large haulers should be equipped with retarders
- much work is needed on tires; many contractors are interested in the development of puncture- and blowout-proof tires.

**Maintenance**—Because contractors have to set up shop in the field, the standards of maintenance and repair are often marginal. Facilities are limited and personnel, in most instances, are untrained in the correct servicing practices needed to maintain reasonable levels of equipment availability. Truck owners are constantly striving for a nucleus of people who can trouble-



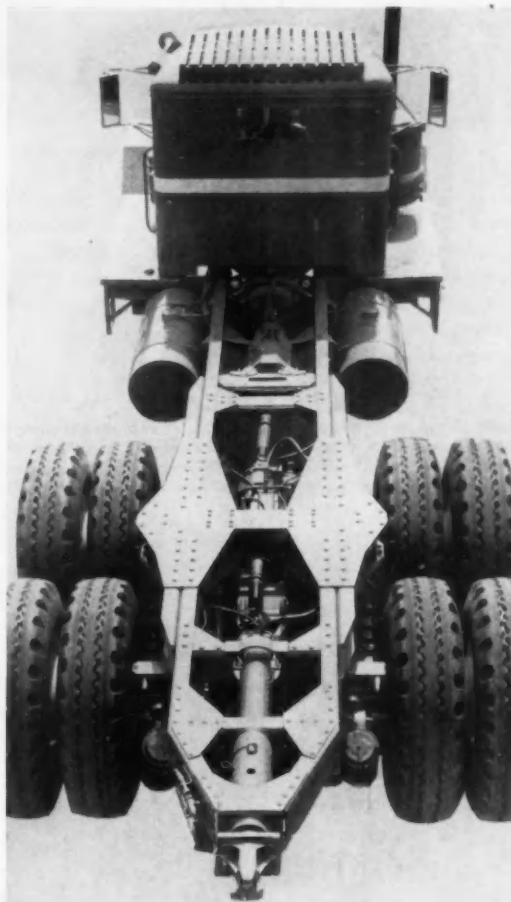
Relying solely on environmental testing, however, provides only a partial answer. Machines and equipment do not always fail because of one disease or one condition such as vibration.

In an industry where almost anything is less costly than a customer's complaint that can lead to lost business, the following comments by some of the top users of off-highway trucks are considered worthy of mention:

- filters and surge tanks should be an integral part of the cooling system
- the design and construction of drive line universals should be such that bolts would not require constant tightening

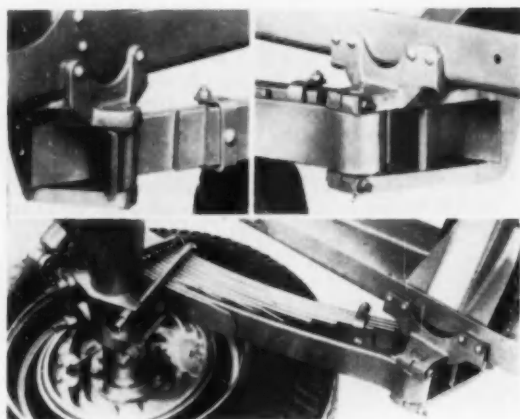
*Autocar's new six-wheel drive off-highway chassis has a 55,000 lb GVW rating. Mixer model employs steel cable neoprene toothed belt from the engine flywheel to the power takeoff shaft. Standard engine develops 185 hp at 3400 rpm.*

*Entire suspension assembly of Peterbilt Motors' Model 381 is bolted together. Heavy-duty trunnion pedestal and frame bracket assemblies support trunnion tube from inside and outside spring seats. Spring leaves, assembled with centering balls, can be replaced without disturbing trunnion.*





Capacity of Euclid R-27 rear-dump has been boosted from 22 tons to 27 tons. Bottom of the body is welded sandwich construction with 1½ in. oak planking between bottom and liner plates. Both front and rear springs have thrust block suspension and are free floating. Operator's cab is off-set to left.



(Bottom) View of two-stage variable-rate rear spring; leaf-type control arms absorb driving and braking torque on the Chevrolet dump truck. Second leaf hooks over pin in hanger. Unique feature is canted U-bolts. (Top left) Rear spring hanger in detail; second leaf has right angle bend at end to engage pin stop for keeping assembly in place in event of control arm failure. (Top right) Detail of front spring hanger showing torque arm and attachment.

shoot and can preach preventive maintenance. The problem becomes more acute as assemblies such as engines, transmissions, torque converters, power trains, etc. increase in complexity.

Manufacturers are now actively pushing a number of programs that are specifically tailored to improve these conditions.

There is a strong trend toward unit design, . . . completely pack-

aged assemblies that can be removed and/or installed in one way, and only one way, . . . units that take only a matter of minutes to replace.

Points to be lubricated are constantly being reduced in number and concentrated in areas that are easily accessible and relatively free from dirt and grit. The number of grades and types of greases and oils to be carried in inventory on the job has diminished to a point where, today, two or three are sufficient.

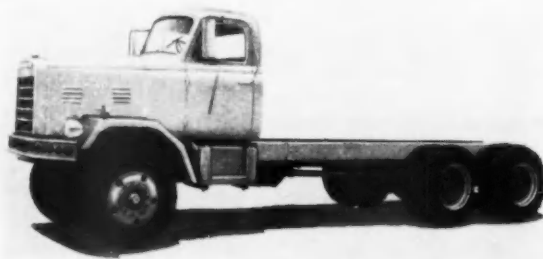
Specialized training schools for contractors' personnel are on the rise. Intensive courses in systems, assembly details and special design features of new equipment enable the mechanics to understand their vehicles, maintain them efficiently, locate faults as they arise and carry out minor repairs. Maximum use

(Turn to page 134, please)

Rear dump unit of Allis-Chalmers TR-260 motor wagon is interchangeable with scraper. Tractor is powered by an A-C Diesel rated at 230 hp. Wagon has struck capacity of 11 cu yd, heaped at 15 cu yd.



FWD claims that its Model CL6-457 is the lightest weight six-wheel drive unit produced for ready-mix market. The truck has aluminum wheels, running boards, fenders, tandem suspension, fuel tank and battery box. Chassis of the 52,000-lb truck is shown here.



# Leyland Heavy-Duty Trucks

## Feature Optional Engines and Transmissions



*Hippo dump truck is one of the new cab-over-engine Leyland models offered with 2, 3 or 4 axles, 140- or 200-hp Diesel engines, and 5-, 6- or 7-speed transmissions*

**T**HE new Leyland range of high-powered trucks covers three basic heavy-duty models with gross ratings from 14 to 24 tons. They comprise the 4-wheeled Beaver, 6-wheeled Hippo and 8-wheeled Octopus produced as transports, dumpers and tractors in 15 different cab-over-engine combinations.

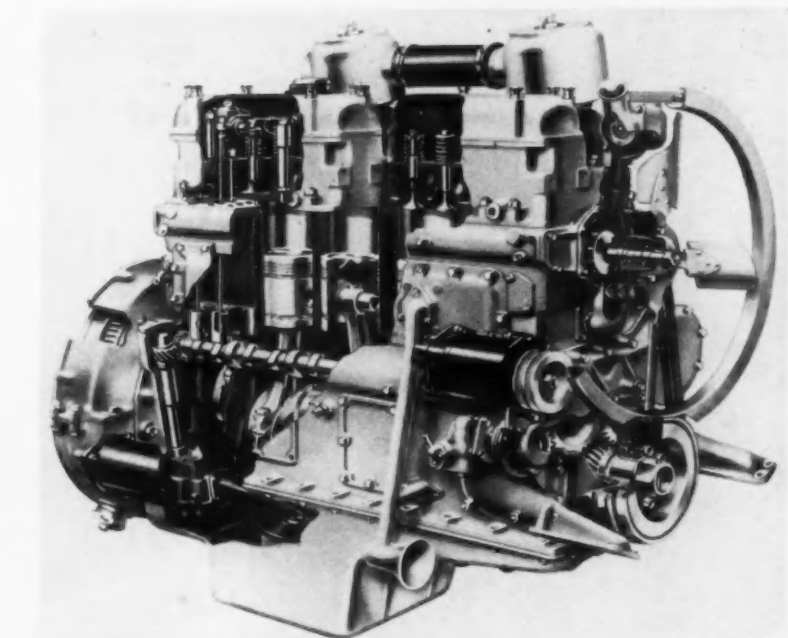
Optional six-cylinder Diesels are a 597-cu in. unit with a net output of 140 hp at 1700 rpm and a torque of 438 lb/ft at 1200, and a 677-cu in. engine developing 200 hp at 2200 rpm with a 548-lb/ft torque also at 1200 rpm. The first is intended for economy operation, while the larger is designed for highway cruising at speeds up to 70 mph.

Both are developments of previous Leyland engines, but with substantially higher output and lower fuel consumption obtained largely by a new spheroidal combustion chamber.

They also feature a self-adjusting centrifugal water pump, wax-type thermostat unaffected by pressure differences between engine and radiator, and a closely-shrouded cooling fan to prevent recirculatory air-flow through the radiator core.

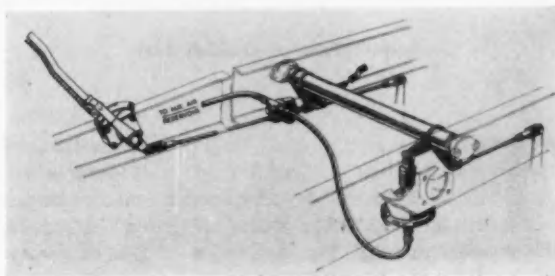
The 16 $\frac{1}{4}$ -in. clutch is hydraulically actuated via along-stroke slave cylinder, through which adjustment for wear is made automatically. Coupling with the 200-hp Diesel has pneumatic power assistance giving a pedal pressure of only 35 lb.

Common to all models is the 5-speed transmission that can be optionally fitted with two additional ratios: a 9.31 to 1 crawler gear and



*Six-cylinder Diesel of 597-cu in. displacement develops 140 hp at 1700 rpm*

*Handbrake is air-assisted by a diaphragm chamber, acting on the cross shaft, that is controlled by a pull-type valve in the primary linkage*



*Power-assisted clutch for the 200-hp engine has an air diaphragm unit linked to the release lever and controlled by a valve operated by the hydraulic slave cylinder*



a 0.766 to 1 overdrive. The 7-speed box also has a second low-low reverse gear. Two power take-offs  
(Turn to page 101, please)

# SOVIET AMPHIBIOUS VEHICLES

By James D. McGuire  
Office of the Assistant Chief of Staff  
Intelligence  
DEPARTMENT OF THE ARMY

Soviet scheme of maneuver was to complete the crossing by improvising bridging and ferrying equipment from local resources before the Germans could properly organize the opposite bank for defense. The speed and expedients used often astonished and surprised the Germans. This was vividly demonstrated when the German armies reached the Dneiper River in the summer of 1941. The problem of crossing presented a serious obstacle to the German command. How quickly and easily this problem could be solved was demonstrated a few days later by the Soviet Army. During the course of one night a Soviet cavalry corps crossed the river using field expedients for ferrying men and equipment to the opposite bank



Soviet PT-76 amphibious tank



BTR-50P amphibious armored personnel carrier

**T**HE SOVIET ARMY, aware of the problems of fighting in Europe where there is a major water crossing about every 50 miles and a minor one about every 15, has developed a versatile family of amphibious vehicles. These vehicles, which include amphibious tanks, armored personnel carriers, cargo transporters, amphibious trucks, and cross-country vehicles, enhance the mobility of the Soviet Army. Employment of amphibious tanks and self-propelled amphibian ve-

hicles transporting artillery greatly reduces the time in which weapons can be placed in firing positions on the far bank in river crossings. Use of armored personnel carriers, cargo transporters, and trucks capable of operating in inland water provides a rapid method of crossing troops, equipment, and supplies. Use of these vehicles also permits deep reconnaissance unhampered by streams.

These amphibious vehicles give a decided boost to Soviet river-crossing capabilities, adding to the already extensive experience gained during World War II. Then, the

and penetrated deep into the lines of the surprised Germans.

Two years later the German armies, retreating westward, arrived at the same sector of the Dneiper, and had great difficulty in crossing it ahead of the Soviet Army. By calling on all the forces and means at their disposal, the Germans managed to occupy seven existing bridges in a sector 300 miles long, but were able to establish only one floating bridge and one improvised ferry. The Soviets, following in close pursuit, succeeded in building 57 bridges, nine foot bridges, and other facilities for



crossing the river.

Since the War, Soviet training in river-crossing techniques has received much emphasis. Bridging and ferrying equipment and tracked and wheeled amphibious vehicles are employed in this type of action, and tactical concepts have been revised to conform to the present concepts of dispersion and maneuver.

Soviet river-crossing tactics are divided into two general classifications—deliberate and hasty. For both types of crossings the first assault wave consists of amphibious personnel carriers accompanied by amphibious tanks. Upon reaching the far bank, the tanks proceed ashore to provide protection while the personnel carriers discharge troops and guns and return to the

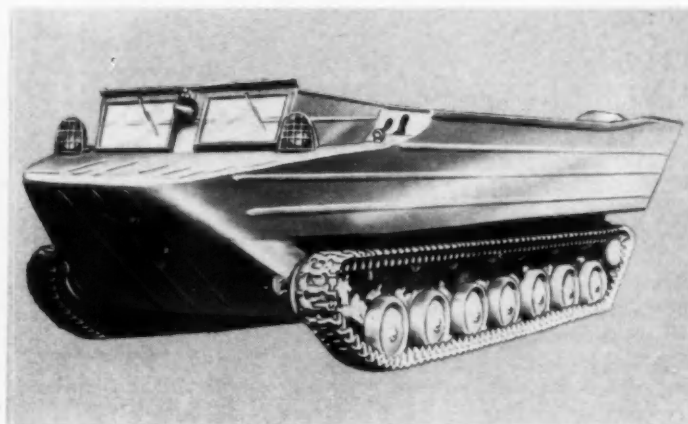
hydrojet principle. Two turbines suck water in through intake ports located in the hull bottom and expel it through hydrojet ports in the rear of the tank. Steering is accomplished by closing deflector plates which cause the flow of water to be directed out either side of the hull. The PT-76 is capable of crossing a maximum trench of 9.1 ft and climbing a maximum step of 3.5 ft. Somewhat of a drawback is that amphibious operation is limited to relatively smooth inland waters because its freeboard is only 8-10 in.

Despite this drawback—and perhaps it has been overcome—the Soviet Army considers the chassis of the PT-76 as an excellent product of modern engineering. This chassis, with modifications, is em-

ployed in five different roles: the PT-76 amphibious tank; the 15-nautical-mile rocket launcher, a new rocket launcher displayed during the Moscow 1960 May Day parade; the BTR-50p amphibious armored personnel carrier; and the "Penguin" cross country vehicle. Use of one chassis for five vehicles facilitates not only manufacture, but also supply and maintenance procedures.

The BTR-50p amphibious armored personnel carrier, which employs the chassis of the PT-76 amphibious tank and which is used in the first assault wave in river crossings, weighs 16 short tons and mounts one 12.7 mm DShK M1938/46 heavy machine gun. It has a crew of three and can carry 12 persons. The entire hull of this APC is lightly armored. Use of cellular-type road wheels reduces unsprung weight and increases the vehicle's buoyancy in water.

Another amphibian used in river crossing is the thin-skinned K-61 tracked amphibian. It weighs 10.4 short tons when empty, and has a crew of two. It is capable of carrying artillery pieces, and crews, up to and including a 152 mm howitzer, or a GAZ-63 truck, or 50 persons. The vehicle has seven road wheels and seven return rollers per side, and employs torsion-bar suspension. It has a Diesel engine of 210 hp. At the rear of the long,



**Soviet K-61 tracked amphibian**



**GAZ-47 tracked transporter**

near bank for subsequent loads. In the meantime, the Soviets sappers have begun construction of ferries for the supporting artillery, tanks, and wheeled vehicles.

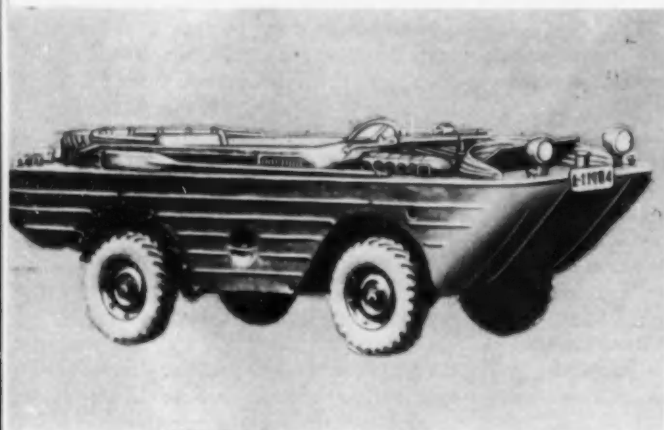
The amphibious tank employed in such operation is the PT-76 amphibious tank which combat loaded weighs 15.4 short tons and mounts a 76 mm gun. This completely amphibious vehicle has a crew of three and features a boat-like hull with a flat deck on which is mounted a small dome-shaped turret. It has a V-6 Diesel engine which develops 237 hp. In the water the PT-76 is propelled on the

played in five different roles: the PT-76 amphibious tank; the 15-nautical-mile rocket launcher, a new rocket launcher displayed during the Moscow 1960 May Day parade; the BTR-50p amphibious armored personnel carrier; and the "Penguin" cross country vehicle. Use of one chassis for five vehicles facilitates not only manufacture, but also supply and maintenance procedures.

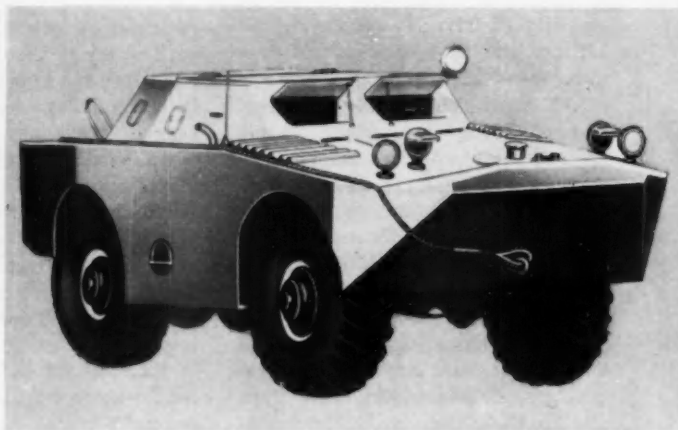
The BTR-50p amphibious armored personnel carrier, which employs the chassis of the PT-76 amphibious tank and which is used in the first assault wave in river

deep cargo compartment is a hinged tailgate which forms a loading ramp when lowered. In water, the K-61 is propelled by two large three-blade propellers located on the rear of the vehicle.

Also employed in the early stages of a river crossing is the ZIL-485 amphibious truck which is mounted on the chassis of the Soviet ZIS/ZIL-151 6x6 truck. This amphibian closely resembles the old United States DUKW 6x6 truck. The Soviet vehicle can be distinguished from the DUKW by the long cargo compartment which extends to the extreme rear of the vehicle and by



**GAZ-46 amphibious truck**



**Amphibious wheeled (4x4) armored reconnaissance vehicle**

the provision of a tailgate. The ZIL-485 amphibian weighs 7.5 short tons and is powered by an 110 hp gasoline engine. In water, it is driven by a single large propeller and can transport 25 men or an 85 mm field gun and crew.

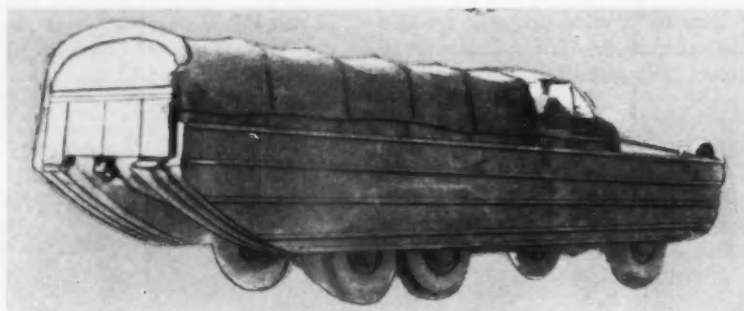
Another versatile amphibious vehicle which could be employed in a water-crossing role is the GAZ-47 tracked transporter. This vehicle was designed for transporting passengers and cargo cross country under all conditions. It has a low ground pressure of only 2.84 lb per square inch, and it is well suited for operations in marshy terrain and snow-covered areas. The weight of this vehicle is only 4.2 short tons, but it can carry nine men or a 1.1 ton payload. The GAZ-47 is powered by a gasoline engine of 70 hp, has a two passenger cab, and a hermetically sealed body, making it amphibious. It is propelled in water by the tracks.

The "Penguin" (not illustrated), which employs the chassis of the PT-76 tank, is an unarmored cross-country vehicle, built specifically for use by Soviet Antarctic expeditions. It is not reported as a military vehicle, but its military applications are obvious. The Penguin features the boat-like hull of the Soviet amphibious personnel carrier, upon which is mounted a box-like superstructure that extends almost the total length of the vehicle. It weighs 12 short tons and has a payload of 2.5 tons. Tracks are double width, enabling the ve-

hicle to negotiate ice and deep snow with ease.

In addition to the above vehicles, the Soviet Army also uses two smaller, wheeled amphibious vehicles, the GAZ-46 amphibious truck and the amphibious wheeled (4x4) armored reconnaissance vehicle. The GAZ-46, built on the chassis of the GAZ-69 utility truck, has a weight of 3841 lb, and can carry five men, including driver. Its gasoline engine develops 55 hp. In water the vehicle is propelled by a three-bladed propeller located in the rear.

The amphibious wheeled (4x4) armored reconnaissance vehicle is the latest member of the Soviet family of amphibious vehicles. It is fully amphibious and has permanently attached overhead armor cover for the crew and passenger compartments. The overhead armor plates are hinged, to be opened and folded back. This newest vehicle weighs combat loaded seven short tons and carries four men. It is driven by a gasoline engine of 80



**ZIL-485 amphibious truck**

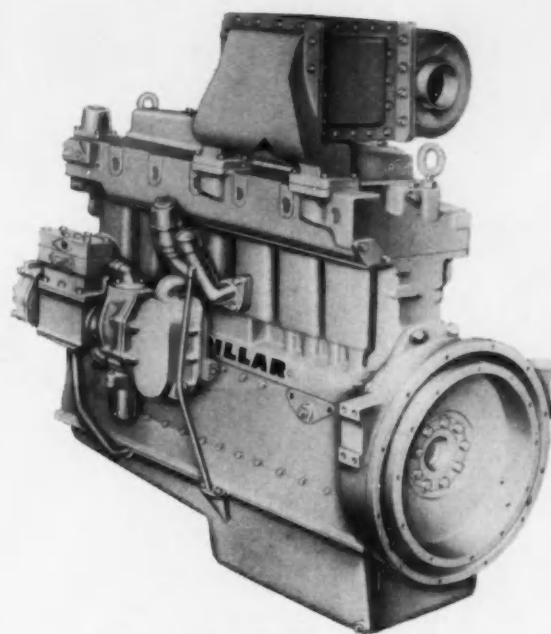
hp. Propulsion in the water is by a single propeller located beneath an armored cover plate in the lower rear hull of the vehicle. This vehicle probably uses basic chassis components of the 4x4 GAZ-63 truck.

The presence of these amphibious vehicles in ever-increasing numbers in the hands of troops reveals the considerable Soviet effort to achieve mobility and to enhance river-crossing capabilities. It is to be expected that the use of these vehicles, as well as improved versions, will continue to expand. These vehicles also are a small but significant measure of the Soviet policy of being prepared to fight under a wide range of environmental conditions. ■

**AUTOMOTIVE  
INDUSTRIES . . .**  
*is your News Magazine of  
Automotive and Aviation  
MANUFACTURING*

# CATERPILLAR

## Taps Truck Market with New Diesel



New Caterpillar 1673 Diesel engine

CATERPILLAR, long a major producer of Diesel engines for construction equipment, has gone to market, . . . the truck market. Its new Model 1673 Diesel engine is tailored to meet the requirements of an estimated 90 per cent of the Diesel trucks now on the road.

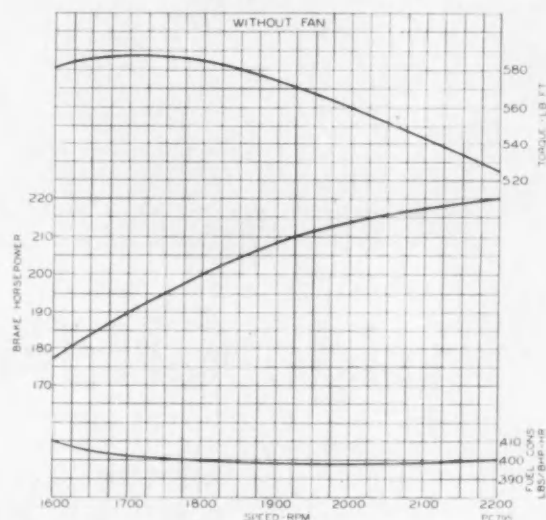
The new model is a 6 cylinder, 4 stroke, engine with replaceable full-length wet type liners. A turbocharger and aftercooler are standard equipment. Displacement is 525 cu in., with a bore and stroke of 4.5 x 5.5 in. With a compression ratio of 18:1, maximum torque is 587 lb ft at 1700 rpm.

The fuel system features adjustment-free individual injection pumps and single orifice injection valves. Fuel is filtered through replaceable cellulose elements. Standard fuel is No. 2 fuel oil (ASTM Specifications D396-48T), often referred to as No. 2 furnace or burner oil with a minimum cetane rating of 35.

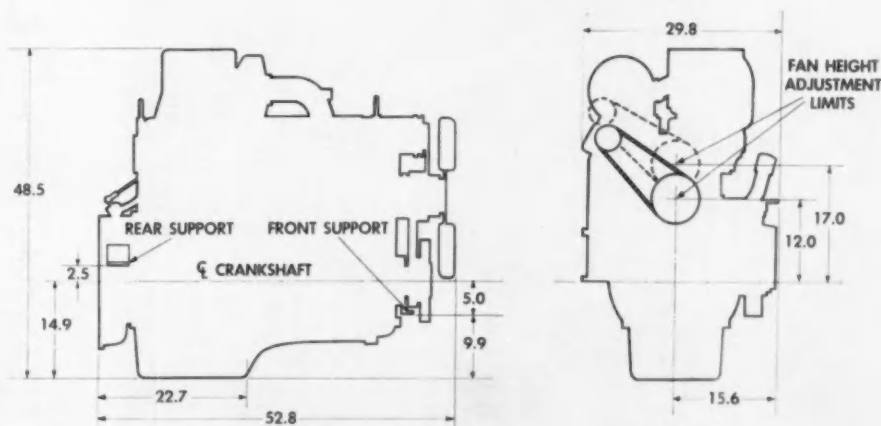
The induction system is turbocharged and after-cooled. Air leaves the turbo at 330 F and leaves the aftercooler at 200 F. The aftercooler permits increase of power by an appreciable margin without adding to peak pressures.

The precombustion chamber system is designed to provide more complete combustion of a wide variety of fuels under varying conditions of speed and load. Caterpillar says the system minimizes objectionable smoke and odor characteristics and also prevents fouling and crankcase dilution under idling or part load operation.

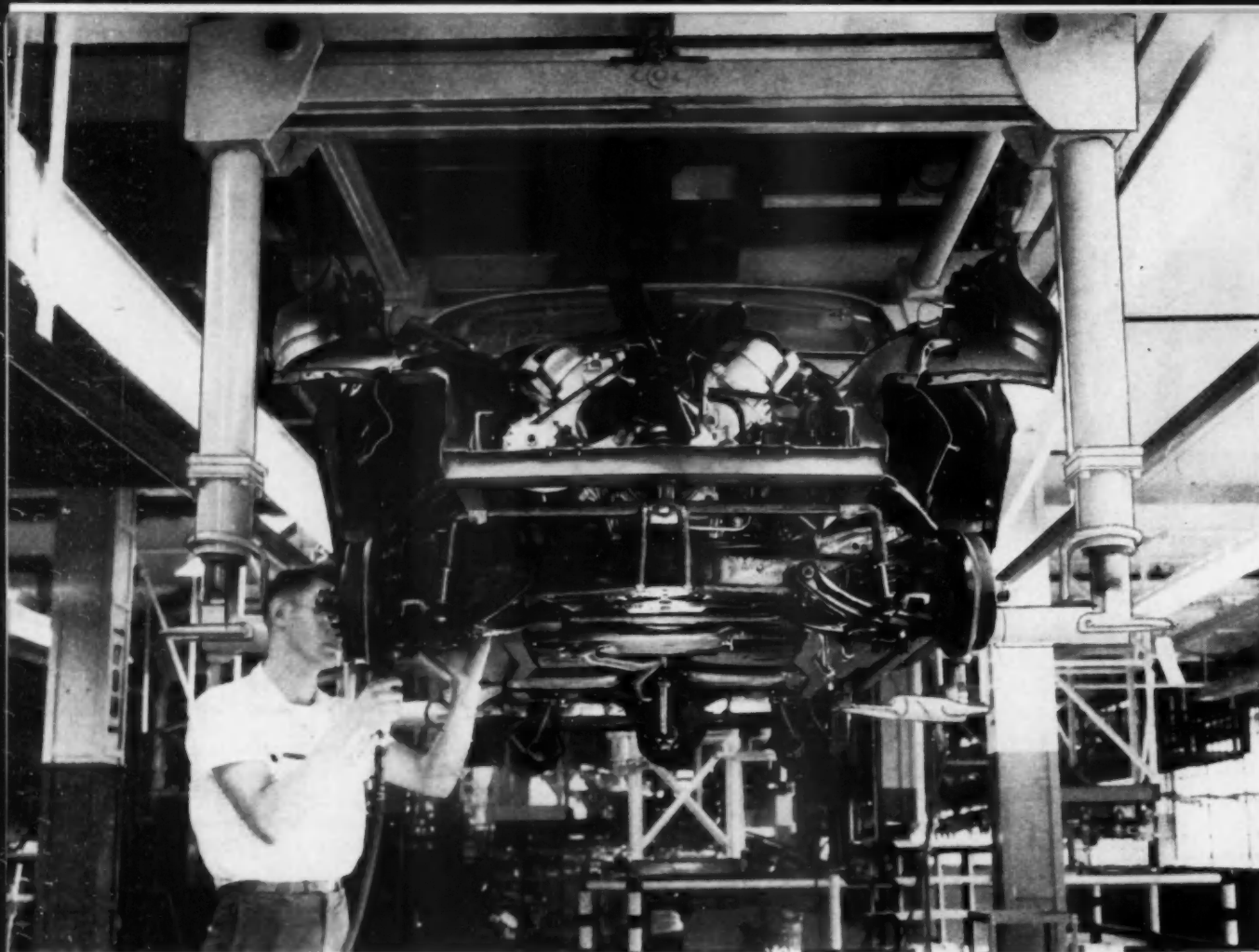
Additional features include valve rotators, an integrally cast iron insert for the top piston ring, aluminum alloy, steel backed crankshaft bearings that are tin plated for break-in. ■



Torque, horsepower, and fuel consumption curves of the new engine

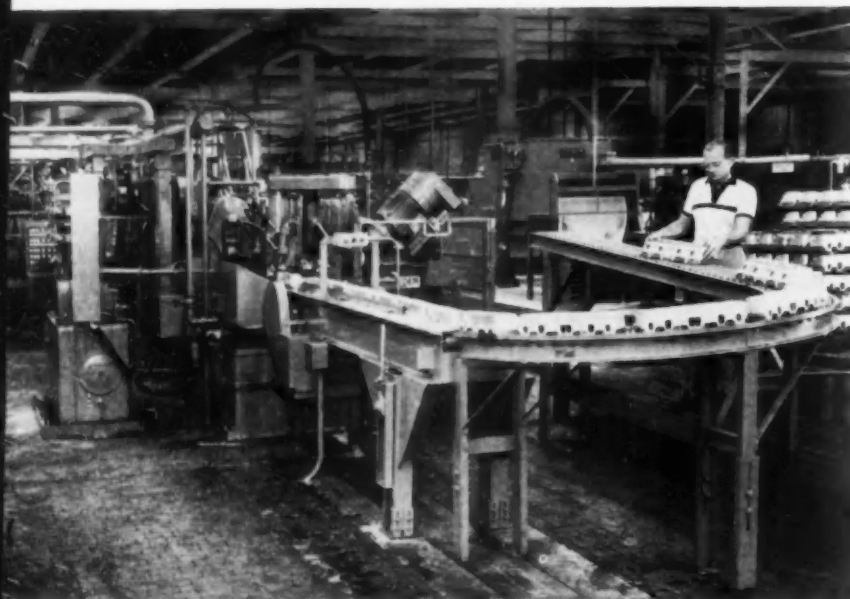


General dimensions of the new truck engine



# "Inside Oldsmobile"

## Candid Camera Views of F-85 All Aluminum Engine Production

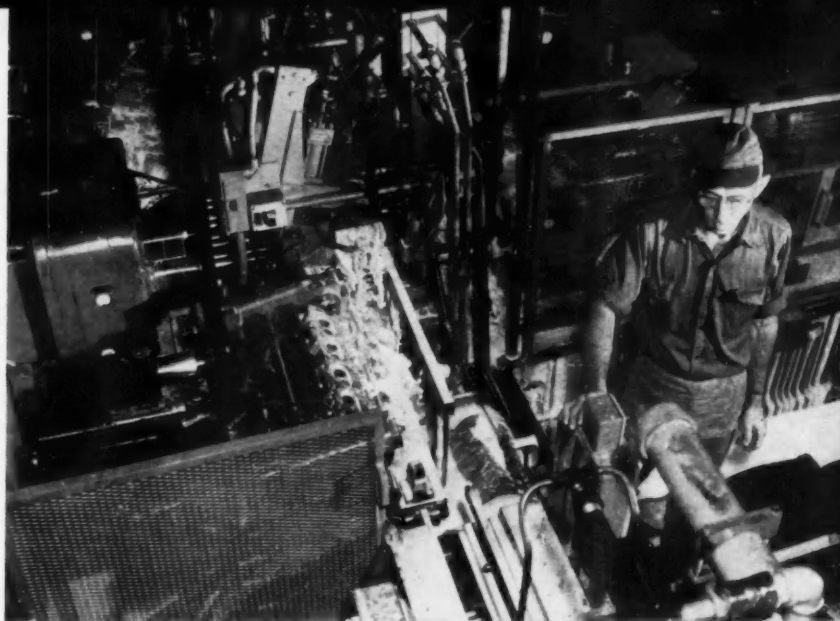


MODERN precision methods and equipment are highlighted in these exclusive "candid camera" views of major production operations on the all-new, aluminum V-8 Oldsmobile F-85 engine

Over-all view of the start of the Oldsmobile F-85 cylinder head machining operation. The rough aluminum cylinder head casting is here placed on a roller-type conveyor system to be fed into the machining mills. A Snyder multiple-bank milling machine is the first stop for the rough cylinder head casting.



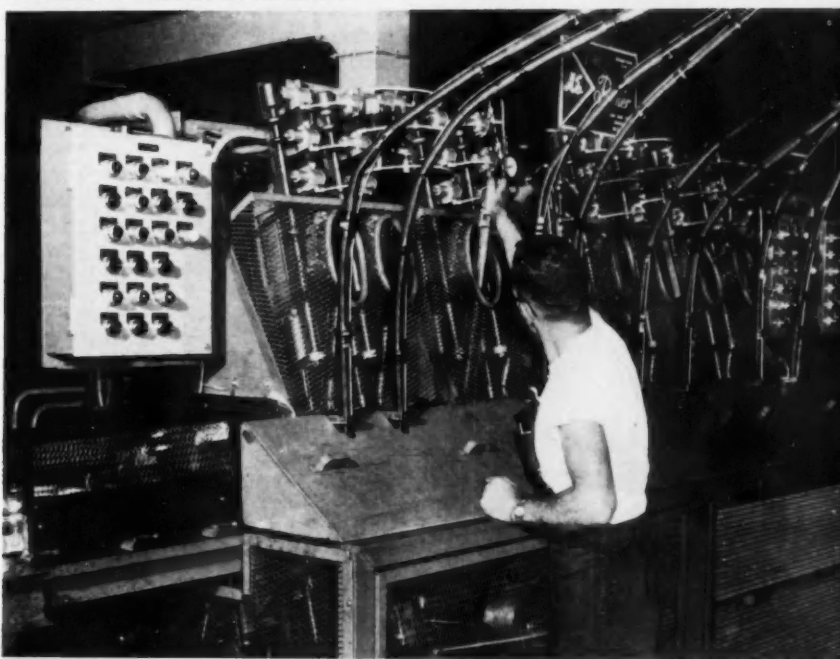
View of overhead body carriers (arm-like structures extending downward from ceiling). Each Oldsmobile F-85 body is carried on four of these "arms," one at each wheel point. This operation is located near the "under-body" portion of the assembly line.



This drilling-reaming-boring-tapping machine cuts more than 50 holes in the aluminum cylinder head. Supplied by Foote-Burt Machine Co., the unit also serves as a convenient load-and-unload point in the cylinder head machining line. Any line break-downs are divided here, occurring either prior to this operation or after it.

## Another AI Exclusive Picture-Story

Automatic assembling machine, made by A. E. Parker & Son, assembles Oldsmobile F-85 valve guides and valve seat inserts. Almost entirely hydraulically operated, this assembling unit, which has an automatic feeding device, will operate at speeds up to 120 units per hour. The valve guides and valve seat inserts are made of cast iron.



Final machining operation on the aluminum cylinder head is the "finish mill joint face," performed by a specially-designed milling tool built by Snyder Milling Machine Co. The operation is located on the F-85 engine machining line.



# Mechanized Molding System at Deere's Dubuque Tractor Works

**A** NEW system of molding gray iron, worked out by engineers of Deere and Company, and developed into a semiautomatic molding cycle



*View of the 12-station turntable*

*Sand blowing station where sand and resin are blown between contoured flask and pattern*



with equipment by Demmler Mfg. Co., is in operation at Deere's Dubuque Tractor Works.

Operation of the process calls for the manual, start-stop, or continuous automatic mechanical handling of heavy cast iron permanent molds having shell process liners and shell process coring. The permanent molds are commonly referred to as "contoured-flasks." These contoured-flasks follow the general geometric profile of the cope and drag shell process patterns. They are fitted with precision alignment bushings that mate with the precision alignment pins fitted to every shell process pattern.

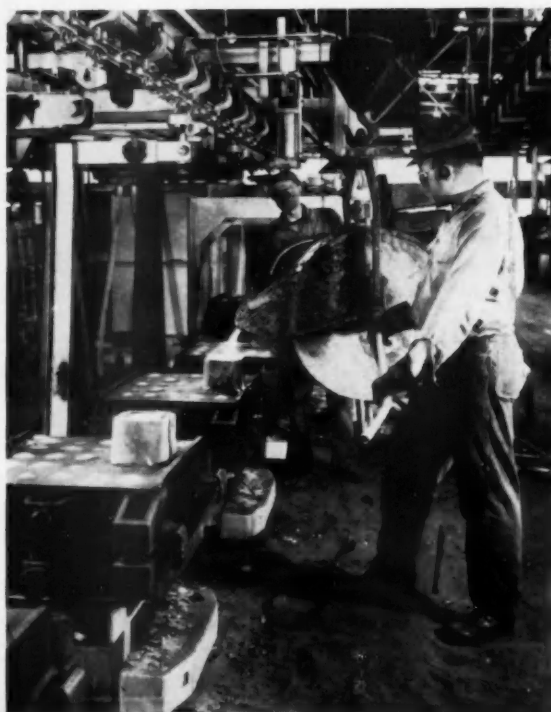
When a contoured flask is placed in position on its respective pattern, there is a gap between them which may vary from  $\frac{1}{4}$  in. to  $\frac{3}{4}$  in. depending upon the surface geometry dictated by the casting form. The top side of each contoured flask is machined flat and blow ports are bored down to the face of the contoured gap. It is through these blow ports that resin-sand mix is introduced to form the liner. When the contoured flask is stripped off the pattern, the liner remains with it. It is this liner which provides the mold refractory and into which shell cores are set prior to the mold being closed and wedged ready for pour-off.

In the overall system, the contoured flasks leave the shake-out point and proceed down a conveyor to the flask heating tunnel oven to restore their temperature to 450F by the time they arrive at the loading station of the molding machine.

The molding machine is a gas fired rotary type having a loading station, blow station, stripping station and transfer units disposed around the index table. Each of the 12 burner boxes mounted on the table is equipped with line burners and automatic temperature controls for maintaining the operating

*(Turn to page 119, please)*

*Iron is poured by hand from a suspended ladle*



# British Hydrostatic Drive for Vehicle Transmissions

**T**HE Dowty hydrostatic transmission has been specially developed by Dowty Hydraulic Units, Ltd., in Ashchurch, Glos., England, for off-road vehicles. Known as the "Dowmatic," it comprises a variable-output piston-type pump and individual fixed-displacement motors for the drive wheels.

This equipment is intended for tractors and heavy-duty vehicles subject to frequent changes of gear and reversals. It offers the advantages of single-lever control, stepless speed ratios from zero to 1 to 1 in both directions, elimination of wheel brakes, small size and weight, and a flexible layout.

The pump is of the axial plunger tilting-head type, with the cylinder

barrel carried on a swivelling yoke and angled by a hydraulic servo jack to vary piston stroke and therefore oil delivery. A constant-velocity universal joint connects the input shaft to the barrel.

Motors with a fixed angle of 35 deg are of similar construction, and use identical rotating parts. Pipe connections between these major components form the main hydraulic circuit.

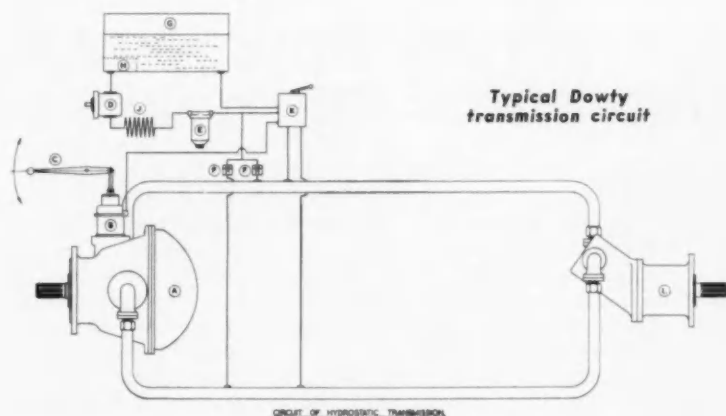
Of special interest is the additional low-pressure circuit which permits efficient filtration of the hydraulic fluid, and constantly de-aerates the system to obviate completely the need for bleeding.

Gear pump (D) draws oil from reservoir (G) and injects it into

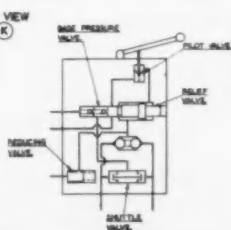
the main circuit through one of the non-return valves (F). A pressure-sensitive shuttle valve in valve block (K) selects the return path to the reservoir on the inlet side of the pump for this secondary flow. In addition, small leakages from the pistons and other points in the main units are separately returned to the reservoir.

This arrangement insures that all the oil is in circulation, and permits the inclusion of a standard paper filter (E) in the low-pressure system.

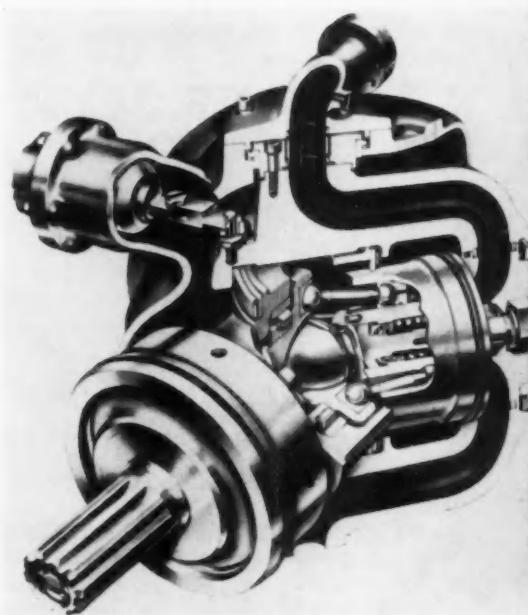
Hydraulic jack (B) contains an integral control valve linked to operating lever (C). Oil for this servo is taken from a pressure-reducing valve in the high-pressure line. When the pump is at zero delivery angle, secondary oil pressure makes possible initial actuation of the jack. The pilot valve in block (K) unloads the main relief valve so that the engine can be started after stalling with the main pump not in neutral position. It also permits towing the vehicle with the engine stopped. ■



ENLARGED VIEW  
OF UNIT (K)



- A PUMP
- B SERVO JACK & CONTROL VALVE
- C SPEED CONTROL LEVER
- D BOOSTER PUMP
- E FILTER
- F NON RETURN VALVE
- G RESERVOIR
- H SUCTION STRAINER
- I COOLER
- K RELIEF & SHUTTLE VALVE BLOCK
- L MOTOR



Dowty variable-delivery swash plate pump displaces 12.41 cu in., and at a rated input speed of 2000 rpm has an operating pressure of 4000 psi with a flow of 89.5 gpm. Weight is 345 lb.



Dodge Dart half-ton pickup features a new 140-hp, slanted, six-cyl engine

**T**HE 1961 Dodge truck line includes 140 basic models including: conventional; cab forward; 4-wheel drive; forward control; school bus chassis; and tandem units. They range from Dart pickup to a 2½-ton heavy tractor.

Featured among the new power plants are two inclined 6-cylinder gasoline engines with the cylinders slanted 30 deg to the right. The larger of the two inclined engines develops 140 hp at 3900 rpm. It has a displacement of 225 cu in. and produces 215 lb-ft torque from 1600 to 2800 rpm. This engine is standard in all conventional half, three-quarter, and 1-ton models; on half and three-quarter-ton 4-wheel drive units; and on three-quarter and 1-ton forward control models.

The smaller inclined 6-cylinder engine is a similar design and is intended for special applications. Rated at 101 hp at 4000 rpm and with a displacement of 170 cu in., the engine develops 145 lb-ft torque from 1600 to 3200 rpm.

Aluminum components of the new engine include the water outlet elbow, oil pump housing, distributor case and alternator frame.

A total of 11 gasoline engines will be offered, ranging from 101 to 228 hp, and eight Diesel engines with a horsepower range from 160 to 250.

Gross vehicle weight ratings range to 53,000 lb and gross combination weight ratings to 76,800 lb. In addition, there is a three-quarter-ton forward-control unit

## New Dodge Truck Line Features Inclined Six-Cylinder Engines

on a 104-in. wheelbase. This model is available with either of the inclined engines. It has a GVW rating of 7500 lb.

A new heavy duty, three speed transmission is standard on the Dart pickup and the compact, forward-control unit, as well as on half and three-quarter-ton conventional models, and on one half and three-quarter-ton 4-wheel-drive vehicles.

A 35-amp alternator replaces the conventional generator on the new trucks. The alternator system consists of an alternator and rectifier assembly, and a voltage regulator.

Longer and wider front and rear springs are used on the new trucks. The increased spring length permits reduction of the spring deflection rate.

The windshield area has been increased by 41 sq in. The rear window now has a glass area 86 sq in. larger than before.

Four new Cummins Diesel engines have been added to the line. While retaining the Cummins turbocharged C-175 Diesel and the naturally-aspirated NH-180, NH-195, and NH-220 Diesels first offered in 1960, Dodge is adding the

C-160, NHE-180, NHE-195, and the NH-250 Diesel engines.

The NHE Diesels feature a displacement 10.5 per cent larger than the NH engine of equivalent horsepower. They develop the same horsepower and greater torque than their NH counterparts, but at a lower rpm.

The NHE-180 produces 180 hp and 534 lb-ft torque in a displacement of 743 cu in., and the NHE-195 produces 195 hp and 580 lb-ft torque in a displacement of 743 cu in.

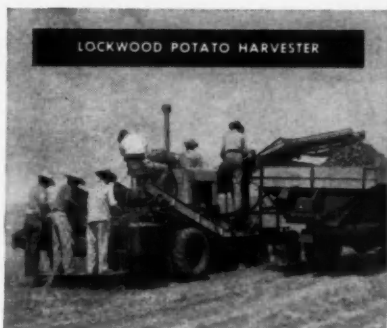
The C-160, rated at 160 hp, develops 376 lb-ft torque in a displacement of 464 cu in. It is designed for stop and go operations.

The NH-250 produces 250 hp and 685 lb-ft torque in a displacement of 855 cu in.

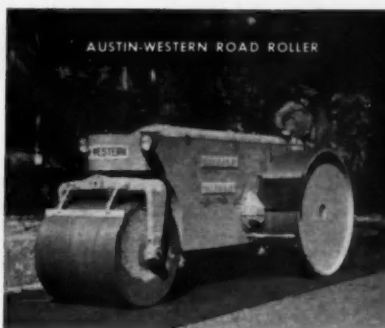
A new 12-speed Spicer transmission is offered on models NC-900, NC-1000, NCT-800, NCT-900, and NCT-1000.

A power take-off unit that derives its power from the engine crankshaft is available on a number of high-tonnage 1961 gasoline models. This makes it possible to eliminate the auxiliary engine in transit mix operations. ■

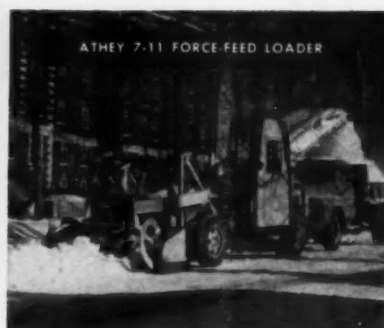




LOCKWOOD POTATO HARVESTER



AUSTIN-WESTERN ROAD ROLLER



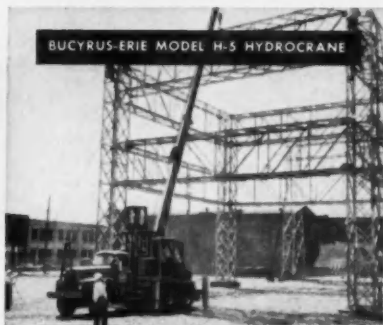
ATHEY 7-11 FORCE-FEED LOADER



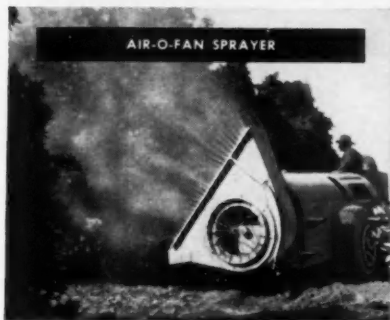
INGERSOLL KALAMAZOO LARC-5



WHITING 3TM TRACKMOBILE



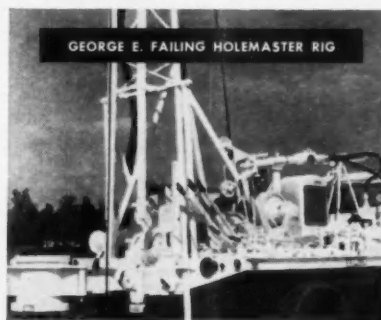
BUCYRUS-ERIE MODEL H-5 HYDROCRANE



AIR-O-FAN SPRAYER



STERLING EARTH BORING MACHINE



GEORGE E. FAILING HOLEMASTER RIG

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# • • INDUSTRY STATISTICS • •

By Marcus Ainsworth  
STATISTICAL EDITOR

## WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending		Year to Date	
	Aug. 27	Aug. 20	1960	1959
<b>PASSENGER CAR PRODUCTION</b>				
Total—American Motors			325,153	267,750
Chrysler	1,281	1,428	56,526	50,277
De Soto	94	97	16,568	33,969
Dodge	8,118	7,152	284,739	106,863
Imperial	233		8,086	12,207
Plymouth	4,975	3,817	167,931	307,316
Valiant	3,966	3,803	179,076	
Total—Chrysler Corp.	18,097	16,297	713,736	512,732
Comet	5,861	7,534	116,330	26,921*
Falcon	8,924	10,979	334,919	
Ford	2,256	2,264	648,259	1,076,119
Lincoln			13,101	16,749
Mercury	2,575	1,293	101,069	106,521
Total—Ford Motor Co.	19,900	22,365	1,214,278	1,228,220
Buick	198	559	183,975	161,076
Cadillac			109,938	106,281
Chevrolet	8	8,097	1,165,187	1,110,662
Corvair		122	170,641	11,636
Oldsmobile	1		257,369	275,246
Pontiac			308,058	300,172
Total—General Motors Corp.	207	8,778	2,195,166	1,965,073
Total—Studebaker-Packard Corp.	150		70,460	101,934
Checker Cab	110	108	4,824	2,839
Total—Passenger Cars	39,064	47,548	4,523,619	4,078,566
<b>TRUCK AND BUS PRODUCTION</b>				
Chevrolet	102	1,231	274,778	252,592
G. M. C.	1,602	2,003	77,317	61,511
Diamond T	48	48	2,004	4,141
Divco	80		2,792	2,452
Dodge and Fargo	1,183	949	46,968	53,644
Ford	5,260	5,092	243,697	233,486
FWD	11	17	658	696
International	2,164	2,575	85,930	97,554
Mack	375	348	10,564	11,057
Studebaker	89		9,212	9,036
White	194	214	11,707	13,296
Willys	3,498	2,937	91,423	77,535
Other Trucks	95	90	2,965	2,507
Total—Trucks	14,711	15,584	862,015	820,587
Buses	100	40	2,730	1,703
Total—Motor Vehicles	53,875	63,172	5,388,364	4,900,846

\*—Edsel production.

## 1960 TRUCK TRAILER SHIPMENTS

Industry Division, Bureau of the Census

Type of Trailer	Six Months		
	June	1960	1959
<b>Vans</b>			
Insulated and refrigerated	467	3,312	2,156
Steel	41	529	452
Aluminum	426	2,783	1,704
Furniture	268	1,415	679
Steel	230	1,259	555
Aluminum	38	156	124
All other closed-top	2,294	15,227	11,651
Steel	641	3,516	3,292
Aluminum	1,653	11,711	8,359
Open-top	164	1,618	1,055
Steel	69	496	405
Aluminum	95	1,122	650
Total—Vans	3,193	21,572	15,541
<b>Tanks</b>			
Non- and low-pressure			
Petroleum and aircraft refuelers			
Carbon and alloy steel	113	865	1,011
Stainless steel	23	136	125
Aluminum	144	1,022	723
Total—Petroleum	280	2,023	1,859
Chemical, food, and sanitary	67	396	187
Dry materials	148	829	727
High-pressure (LPG, chemicals, etc.)	70	202	152
Total—Tanks	563	3,450	2,925
<b>Pole, pipe, and logging</b>			
Single axle	27	125	159
Tandem axle	100	534	447
Total	127	659	606
<b>Platforms</b>			
Racks, livestock, and stake	135	245	207
Grain bodies	107	799	727
Flats, all types	687	5,288	4,186
Total—Platforms	929	6,332	5,120
<b>Low-bed heavy haulers</b>			
Dump trailers	159	1,149	1,148
All other trailers	186	872	1,153
Total—Complete Trailers	5,414	35,986	27,653
<b>Dump trailer chassis<sup>1</sup></b>			
Trailer chassis only <sup>1</sup>	73	566	
	288	1,813	2,025
Total—Trailers and Chassis	3,775	38,365	29,678
Detachable van bodies	369	1,730	1,083

<sup>1</sup> Sold separately.

## NEW PASSENGER CAR REGISTRATIONS BY REGIONS\*

Zone	Region	Six Months			Per Cent Change		
		June 1960	May 1960	June 1959	June over May	June over June 1959	Six Months 1960 over 1959
1	New England	38,355	40,990	35,188	195,256	161,168	+ 9.00
2	Middle Atlantic	126,787	132,907	106,909	665,590	550,185	+ 18.59
3	South Atlantic	76,381	88,304	75,693	459,358	407,853	+ 13.50
4	East North Central	154,802	162,487	155,828	868,986	794,654	+ 4.73
5	East South Central	24,803	28,709	24,322	157,114	138,342	+ 13.61
6	West North Central	47,425	53,472	50,025	278,596	281,620	+ 1.11
7	West South Central	46,437	52,023	46,833	271,795	256,653	+ 5.48
8	Mountain	20,666	21,096	20,291	115,947	110,280	+ 4.24
9	Pacific	61,208	67,067	67,843	398,627	385,075	+ 3.52
Total—United States		595,864	647,055	585,932	3,411,169	3,087,810	+ 7.91

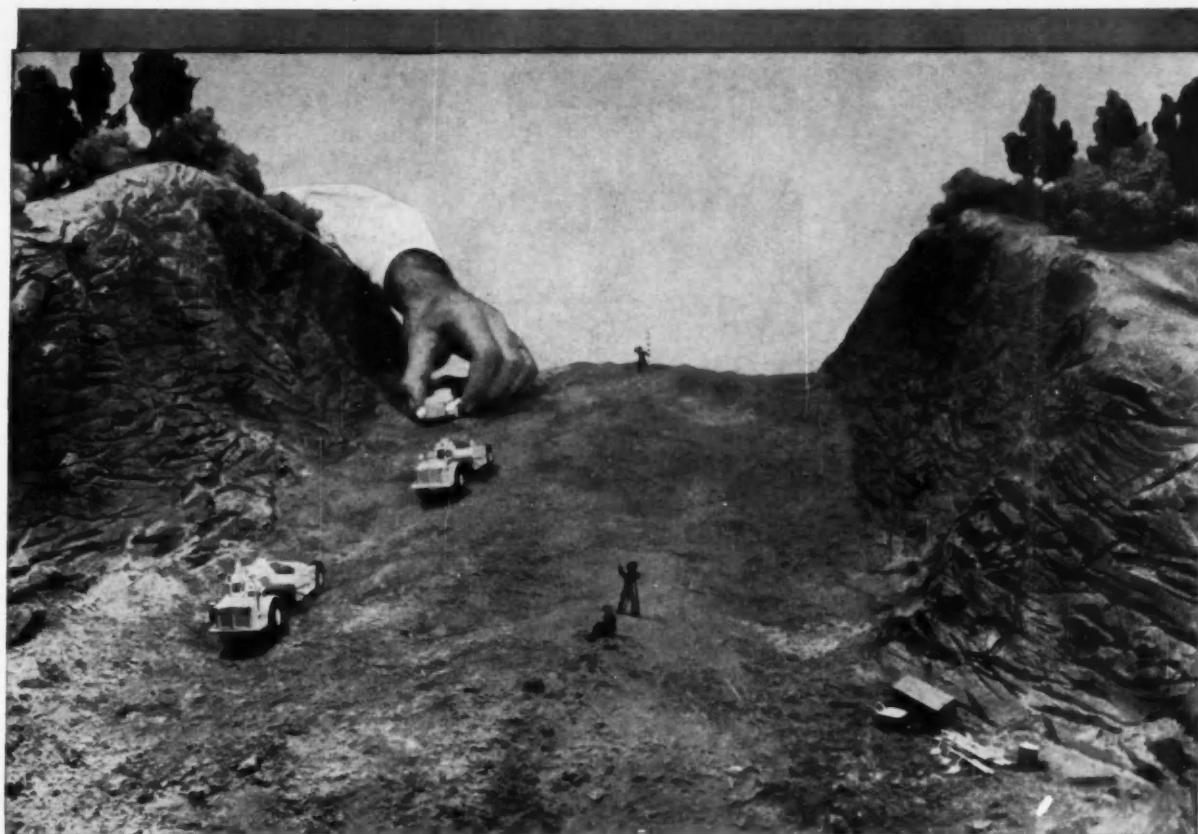
States comprising the various regions are: Zone 1—Conn., Me., Mass., N. H., R. I., Vt. Zone 2—N. J., N. Y., Pa. Zone 3—Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va. Zone 4—Ill., Ind., Mich., Ohio, Wis. Zone 5—Ala., Ky., Miss., Tenn. Zone 6—Iowa, Kan. Minn., Mo., Neb., N. D., S. D. Zone 7—Ark., La., Okla., Tex. Zone 8—Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo. Zone 9—Alas., Cal., H. I., Ore., Wash.

\* Compiled from official state records. Data property of R. L. Polk & Co. May not be copied, sold or reprinted without Polk permission.

## 1960 TRUCK FACTORY SALES BY G.V.W.

As reported by the Automobile Manufacturers Association

Period	6,000 lb. and less	6,001-10,000 lb.	10,001-14,000 lb.	14,001-16,000 lb.	16,001-19,500 lb.	19,501-26,000 lb.	26,001-33,000 lb.	Over 33,000 lb.	Total
First Quarter	205,599	56,756	3,747	9,305	55,290	20,834	10,805	10,037	372,375
Second Quarter	189,711	51,817	3,052	9,931	48,018	20,534	10,687	10,283	344,033
Total—6 Months	395,310	108,575	6,799	19,236	103,308	41,368	21,492	20,320	716,408
July	37,576	13,103	917	3,283	13,018	6,151	2,711	2,685	79,444
Total—7 Mos. 1960	432,886	121,678	7,716	22,519	116,326	47,519	24,203	23,005	795,852
Total—7 Mos. 1959	388,058	121,775	10,248	68,802	92,820	40,757	25,388	24,660	773,508



## Custom made for rugged service

Big-job earth moving is a slamming, bruising, round-the-clock business that plays hob with construction machinery. Only the best custom-designed equipment can take the brutal punishment.

And only the finest, toughest seamless tubing can come up smiling in this rugged service. Custom quality Ostuco Tubing stands the gaff . . . fills the bill order after order.

If you're now compromising with stock tubing, consider all the advantages of custom quality Ostuco Tubing. Consistently you receive the exact tubing you want—the size, length, grade—with the strength and tolerances you need. For machined parts, you get our recommended rough size guaranteed to clean up.

With all these advantages, custom quality Ostuco Tubing is obtainable in small minimum quantities—as little as a few hundred feet. Contact your nearest Ohio Seamless representative, or the plant at Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.

A-1282A

Scale model illustrated built to 3.5 mm scale.



Complimentary Copy of new Bulletin CS60 "Ostuco Steel Tubing" sent on request.



## OHIO SEAMLESS TUBE

*Division of Copperweld Steel Company • SHELBY, OHIO*

*Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging*

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Miami, Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

CANADA: Railway & Power Engr. Corp., Ltd.

EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

# News of the MACHINERY INDUSTRIES

By Charles A. Weinert

## M-T Orders in July Off Substantially

Machine tool orders booked in July were down a substantial \$13 million, or 24 per cent, from June's volume.

The traditional summer drop-off, in this case, was undoubtedly heightened by the approaching eve of The Machine Exposition—now in session. Many of the builders some months ago predicted just such a lull.

Preliminary figures for the month of July — compiled by the National Machine Tool Builders' Association—indicate that metal-cutting-machine net new orders amounted to \$32.75 million. Metal-forming-machine net new orders in July are given at \$9.25 million. Combined net new orders therefore totaled an estimated \$42 million.

Foreign orders in July are valued at \$13.95 million net, and domestic net new orders at \$28.05 million net.

For June, the finalized net order figures for metal-cutting and metal-forming machines are respectively \$42.6 million and \$12.5 million, for a total of \$55.1 million.

In July 1959 net orders for both metal-cutting and metal-forming machines totaled \$63.4 million.

Thus far this year (seven months), the net orders for both types of machines total \$377.9 million. Last year they totaled \$368.7 million in the same period.

Shipments in July amounted to a preliminary \$51.65 million, made up of \$39.45 million metal-cutting and \$12.2 million metal-forming machine tools.

In June of this year the equivalent total was \$63.1 million; while in July 1959 the total was \$40.6 million.

During January through July

1960, shipments of both types of machines amounted to \$389.05 million. Last year the seven months' figure on shipments was \$289.75 million.

For the period of January through July, it will thus be seen that this year's shipments are up almost \$100 million above last year, and that 1960 shipments exceed by some \$11 million the 1960 net order receipts—which are, however, \$9 million up from last year's order figure.

## Resistance Welding Progresses in Europe

The lag in resistance-welding-equipment design and application in Europe which has heretofore existed, evidently no longer applies. This situation was recently aired by F. B. Jacob and H. W. Stieglitz, assistant to the president and vice-president of engineering, respectively, or Thomson Electric Welder Co., after their return from a tour of European plants.

After studying welding equipment in six countries—Germany, Switzerland, Belgium, France, England and Scotland—Mr. Jacob and

**Orders for Machine Tools  
in July Totaled \$42 Million,  
for a Drop of \$13 Million  
from June Operating Fig-  
ures. Shipments This Year  
Running \$100 Million Over  
Last Year**

Mr. Stieglitz concluded that resistance welding has become an indispensable tool in European mass-production methods. As in the case of the U. S., it has been integrated into high-volume production lines.

They reported that the European automotive industry, enjoying increasing production demands, is particularly responsible for the accelerating tempo. Complex welding presses equipped with transfer devices and electronic controls duplicate those used by the U. S. automobile industry. Automated lines are becoming more prominent. Both remarked on the facilities operated by the manufacturers. Space conditions were good, handling equipment up to date. Engineering was thorough and sound.

The Thomson executives also reported that the long-standing European practice of accenting self-sufficiency gradually is giving way in many plants. Welding machine manufacturers until recently produced most of the components that went into their units, such as gages, valves, control devices, and machined parts. Now the trend is toward the U. S. method of pur-

(Turn to page 102, please)

## METAL CUTTING AND FORMING MACHINE TOOLS

### Net New Order Receipts, and Shipments

(Millions of Dollars)

	Net New Orders			Shipments		
	Cutting	Forming	Totals	Cutting	Forming	Totals
1960						
Jan.	\$43.45	\$13.00	\$56.45	\$36.75	\$9.65	\$46.40
Feb.	47.70	12.90	60.60	40.00	11.95	51.95
Mar.	48.45	13.50	61.95	51.05	13.45	64.50
Apr.	36.70	15.15	51.85	43.95	11.15	55.10
May	37.95	12.00	49.95	44.30	12.05	56.35
June	42.60	12.50	55.10	48.40	14.70	63.10
July	32.75*	9.25*	42.00*	39.45*	12.20*	51.65*
7 Mos. '60	289.60*	88.30*	377.90*	303.90*	85.15*	389.05*

\* Preliminary.

Source of Statistics: National Machine Tool Builders' Assn.





## YOU CAN'T AFFORD TO WAIT FOR SMOKE SIGNALS!

Smoke signals from an engine are sure signs of excessive engine wear and poor engine performance! To protect the reputation of his product, an engine manufacturer must guard against these tell-tale smoke signals before his product leaves the factory. That's why more engine manufacturers install Fram Filters as original

equipment than any other brand. Why not let Fram's extensive research and testing facilities go to work for you? Fram leads the field in research and Fram engineers always come up with the most efficient and economical solution to every filtration problem! FRAM CORPORATION, Providence 16, R. I., Geneva 4-7000.

*YOUR FIRST LINE OF ENGINE PROTECTION*

**FRAM**  
OIL AIR FUEL WATER  
**FILTERS**

# NEW

# PRODUCTION and PLANT

# EQUIPMENT

By C. J. Kelly  
ASSISTANT EDITOR

FOR ADDITIONAL INFORMATION, please use reply card at back of issue

## Sixty Inch Holes

THE "Sixty" was designed to gun-drill extremely long holes, ranging up to 60 in. in length and 3 in. in diam. These holes can be gun-drilled from the solid—in one pass—on a production schedule, according to the manufacturer. Infinitely variable feed rates are obtained by a "positive drive" mechanical transmission. Once the feed is set, it will not vary or surge, even when drilling through hard or soft spots—or other intersecting holes. The variable feed rate is adjustable from a minimum of 0.0001 in. per revolution to a maximum of 30 ipm. Spindle speeds are variable up to 10,000 rpm, and can be matched to any feed rate, thus allowing for the differences in workpiece material and the finish required. *Drillmatic Co., Inc.*

Circle 35 on postcard for more data

## Shaft Lapping Machines

SHAFT lapping machines have been designed in a complete range of models for lapping any size shafts up to 84 in. long. These machines use coated abrasive cloth to provide a 1 to 7 microinch finish. They can lap bearing surfaces and fillets in on operation. Their output is reported to be about 150 pieces an hour.

Abrasive cloth in rolls is mounted on the lapping arms. At each cycle the roll is automatically advanced to provide fresh cloth for each new part. Lapping is done under a flood of coolant to keep the abrasive cloth open and to flush away spent abrasive. For lapping action, the shaft is oscillated as it rotates against the lapping heads. This is provided by a spindle assembly that combines rotary and axial motion. *The Foot-Burt Co.*

Circle 37 on postcard for more data

## Push-Button Controls

THREE newly developed push-buttons have been introduced for industry by Clark. Devices available in each of the three lines include: Push-button units; selector switch units; standard pilot lights; and push-to-test pilot lights or lighted push-buttons. Bulletin 100 type HO and H electrical control units are available in the following separate, but related lines: Type HO, oiltight, 1-hole (panel) or base mounted. Units are convertible from base to panel mounting and vice versa. Panel mounted applications include oiltight flush plates for operator's panels and benchboards. Base mounted units are used in oiltight surface-mounted enclosures. Type H, NEMA 1, general purpose, 1-hole (panel) mounted is used for flush plates, operator's panels and benchboards. Type H, NEMA 1, general purpose, base mounted is used for surface mounted enclosures. Design features of the combined control unit lines include: interchangeability of many parts between the three lines; choice of 7 American standard safety colors for both buttons and ferrules (this permits double color-coding arrangements); stationary terminals are held solidly to the contact blocks; fine silver, wipe-action contacts permit reliable contact in all atmospheres. *The Clark Controller Co.*

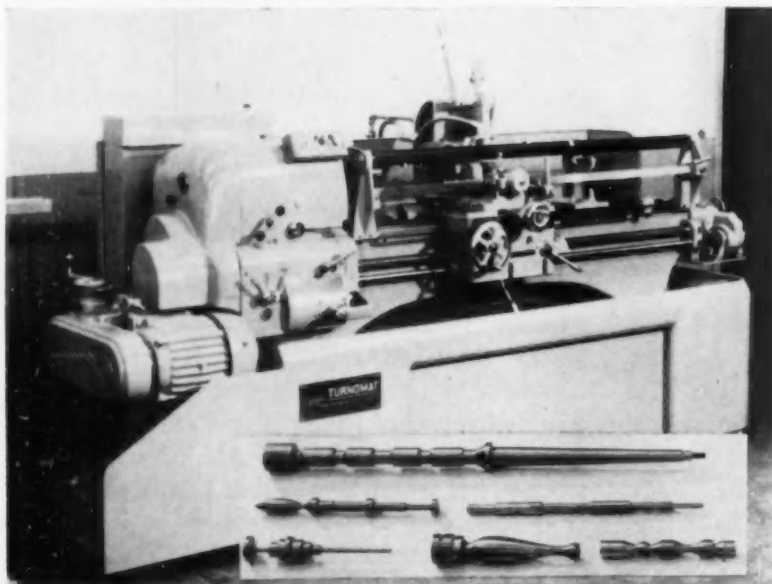
Circle 38 on postcard for more data

## Transmission Unit

TRANSMISSIONS with electro-magnetic clutches have been designed to provide speed changes and reversing under power, without interrupting the power source. Transmissions which are so equipped are available with two to eight speeds, capacities from 52 to 750 lb ft and a wide ratio selection up to 10 to 1. Manual or automatic controlling of speed changes is accomplished with electric switches, tape, cam or other remote control means available. This unit especially adaptable for automatic machinery where transmission is not accessible to the operation. *Western Mfg. Co.*

Circle 40 on postcard for more data

## Centerless Tracing Turning With One Pass



Named the Turn-O-Matic, a new machine has been developed to produce an almost unlimited variety of tapers, turns or radii on long slim work. Some samples made with this unit are shown in the insert. All contours are turned with a single point tool. The need for a tailstock center is eliminated through the use of a rotating spring collet which acts as a work support 0.015 in. ahead of the tool point. *The Taber Instrument Corp.*

Circle 39 on postcard for more data

## Honer for Large Bores

**N**EW design features of this compact honing machine save floor space, simplify operation, and reduce maintenance costs. The model 3010 honer is available with 25, 35, 45 and 60 in. spindle travel. The machine will hone bores up to 10 in. in dia at maximum stroke, and it will hone larger dia bores in shorter lengths. Since no auxiliary electric panels are used, floor space is reduced and external conduit is kept to a minimum. All electric controls are built into the two side panels of the machine. Shoulder height operating controls are removed from the area of coolant splash, and set-up controls are protected by lock and key to avoid undesirable tampering after the set-up has been made. To change spindle speeds, the operator simply turns the two knobs on the right side of the head. One knob selects neutral, low, or high speed ranges, and the other knob selects the specific speed in either the low or high speed range. Eight speeds are provided by a 10 hp motor with a V-belt drive. Stroke length is controlled by a dial mounted on the rear of the control panel arm. *Barnes Drill Co.*

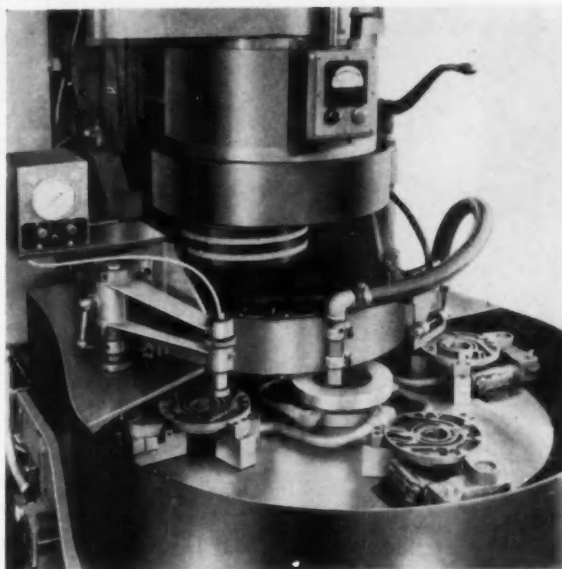
Circle 41 on postcard for more data

## New Principle for Grinding Flat Surfaces

*A new type of rotary indexing surface grinder on which the work is held in a stationary fixture under a wheel spindle that orbits as it rotates, reduces the cost of grinding pieceparts to close flatness tolerances.*

*The principle of generating a flat surface on a planetary head machine is similar in end result to what takes place on a conventional vertical-spindle rotary surface grinder. Instead of the piecepart spinning under a stationary spindle, however, it remains fixed and lets the wheel axis revolve around its center point.*

Circle 42 on postcard for more data



**T**HIS new method of generating flat surfaces has three economic advantages: Holding the piecepart stationary in its fixture keeps it accurately oriented. Thus, it is easy to load, transfer, and unload the part without danger of mislocation. This makes the process ideally suited for grinding from the rough on transfer-type machines. Equipment

costs are reduced because fewer mechanical parts are needed to revolve the spindle than to provide separate drives for spinning the work. Also, fixtures can be simplified. Continuous cutting, with index-type work table, increases machine utilization and permits very high production rates. *Mattison Machine Works.*

**T**HIS precision boring machine utilizes the latest multiple spindle concept and in this application bores a total of twenty-two holes in a small aluminum gearbox frame assembly. Operation is achieved by the use of interchangeable plates carrying multiple spindles.

The workpiece is finished in two setups. Five larger holes on one side of the part are bored at the first operation. Locating from established dowel holes and hand clamping the part in a simple fixture, tolerances on hole diameters are held to within 0.005 in.

The second operation involves boring from both sides. Here the original spindle plate is detached and interchanged with a seven spindle plate. A ten spindle component is mounted at the other end of the machine. After one lot is bored by this method, bronze bushings are assembled in the holes in the workpieces, tools are changed at the machine and the operation is repeated. *Ex-Cell-O Corp.*

Circle 43 on postcard for more data

## Precision Boring Machine Utilizes Multiple Spindles



*To ensure accuracy spindle plates are held to constant temperatures*

## Powerful Radioactive Source Speeds Inspection



Here operator is setting up Gammatron to "quality" inspect large casting

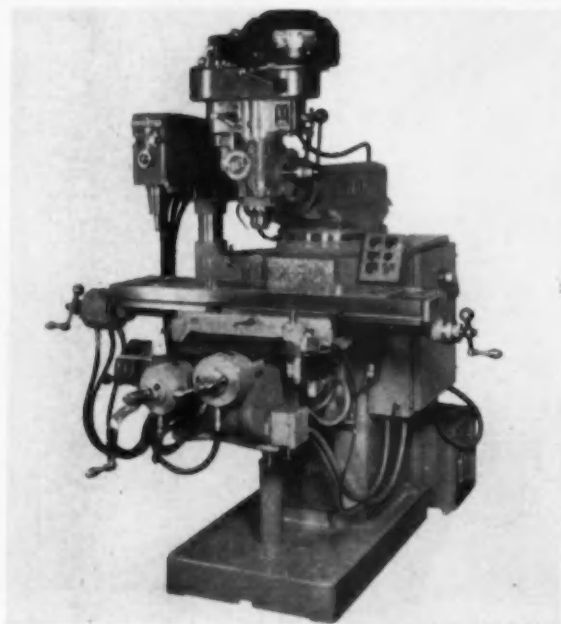
Radiography facilities which were recently installed at the Quaker Alloy Casting Co., Myerstown, Pa., are reported to use the most powerful source ever to be employed in industrial radiography inspection operations. The camera contains 1430 curies of cobalt 60, or the equivalent of 40 million dollars worth of radium.

The unit, called a gammatron, has been in use almost continuously since its installation in a room specially designed to house it. The installation is completely equipped with interlocks, alarms and other fail-safe features, making it one of the safest radiog-

raphy installations in the country, the manufacturer reports. Exposures which previously required hours with an eight curie cobalt 60 source are now shot in seconds, and the new unit produces higher quality radiographs. Eight in. thick sections of steel can be radiographed in as little as five minutes. The radioactive cobalt 60 has an extremely high specific activity of 100 curies per gram—i.e., it is so intensely radioactive that the physical size of the source is very small (one centimeter in diameter) making for sharper radiographs. *Radionics, Inc.*

Circle 41 on postcard for more data

## New Hydraulic Tracer for Automatic Control



Tree Tool and Die Works has announced the addition of a hydraulic tracer control for its 2UVR and 3VG milling machines. The control has been called the Scan-O-Matic. This unit adds fully automatic hydraulic 3-dimensional scanning and profiling to mills and yet maintains their full original ranges and capacities. *Tree Tool and Die Works.*

Circle 47 on postcard for more data

## Narrow Aisle Truck

A NEW, 24 volt model "MN," narrow aisle truck with a hydraulic powered caster enabling side travel has been designed for transporting long heavy loads in aisles as narrow as 7 ft wide. All operating controls are conveniently located at the drivers compartment. The right front base arm has a hydraulic powered caster that can turn 180 deg, enabling 360 deg operation of the truck and precise positioning of loads. *Lewis-Shepard Products, Inc.*

Circle 45 on postcard for more data

## Thread Rolling Attachment

A THREAD rolling attachment has been developed to roll a diametrical range from 1½ to 3¼ in. As with the other five sizes available, this attachment is applicable to turret and tracer lathes and to the larger automatic chuckers and bar automatics. However, when it is applied to lathes, it must be used on machines equipped with power cross feed. Known as the lanroll, this attachment is a tool that is manufactured and assembled with precision to give maximum tool life. Helix angle bushings permit helix angle agreement between the thread rolls and the workpiece to eliminate thread drunkenness and also enable the rolling of threads up to and including a Class 4 fit. Its hinged construction and size adjusting link allow a wide diametrical range while the use of proper thread rolls and auxiliary equipment allow left or right hand, straight or taper threads to be produced. *Landis Machine Co.*

Circle 46 on postcard for more data

## Machine Stop

COMPLETELY mechanical, production-proven machine stop has been developed and manufactured for use on punch presses and other types of machinery. This device is designed to instantly stop a machine, if length of stock per stroke drops below a preset minimum, if stock varies in thickness, if defects such as burrs and tears occur in stock, and when stock coil end approaches. This versatile machine stop is portable and requires only a clutch-tripping solenoid on machine itself to operate. Has only a few simple adjustments which can be accurately set, and according to the manufacturer, once set, these adjustments will not vary. *Rands Products, Inc.*

Circle 48 on postcard for more data



## RPM Measurement at the End of Final Assembly Line

**N**EW 1960 Fords emerging from the final assembly line at the Rouge Plant are now undergoing RPM adjustments without any direct connection to the engine. Four roll test stands have each been equipped with a remote RPM indicator, (insert) which reads speed by picking up magnetic field radiated by the engine's ignition coil.

The engine speed indicators are calibrated with tolerance limits for use with six and eight cylinder engines, and standard or automatic transmissions. The indicators differentiate between six and eight cylinder engines. The system enables rapid conduct of two specific tests at the roll stand. First of these is engine idle RPM test, performed on all models, and the second, a high speed check made only on cars with automatic transmissions. The Indicator is suspended from the ceiling adjacent to each roll stand, so that the operator may read the 8 in. dial while making a test.

Also suspended directly over the automobile front end is a rectangular loop, pointed right at the ignition



All roll test stands are equipped with indicators to measure RPM at Ford plant

coil. The magnetic field set up by the ignition coil expands and collapses with each firing. This action generates a series of electrical pulses in the pickup, the rate of which are identi-

cal to engine RPM. The rate of these pulses is then detected on a linear frequency meter and displayed on the dial. William Christensen and Co.

Circle 50 on postcard for more data

## New Electrode

**T**HE development of a new electrode for the industry has been announced. Designated the 447A, this electrode has a coating to which a small amount of iron powder has been added to improve arc stability on out of position welding. This electrode can be used on AC or DC, straight or reverse polarity. It is available in 3/32 in. dia in 12 in. lengths; 1/4, 5/32, 3/16 in. in 14 in. lengths and the 18 in. length comes in 7/32 and 1/4 in. sizes. Hobart Brothers Co.

Circle 52 on postcard for more data

## Automatic Operation

**O**FFERING wide flexibility, the American six-spindle model AA-Turretex drills, taps, reams, counterbores and faces automatically. Its two-axis, ultra-precision positioning table moves 30 by 20 in. and positions to  $\pm 0.00025$  in. Pre-selected speeds, feeds and tapping cycle for any or all the six spindles, and positive stops with dwell for accurate facing and counterboring, are outstanding features. Spindles are heavy-duty alloy steel mounted with taper roller bearings, and are available with straight bore for number 3 Morse taper ASA adjustable adapter assembly or

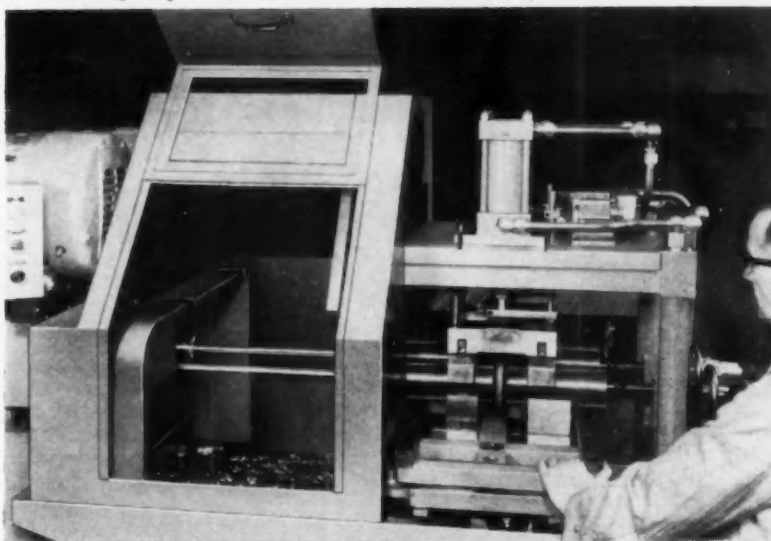
flanged nose for stub nose collet chucking tool for light milling operations. The turret column ways and the positioning table ways are hardened and ground. Lower column base

is massive in construction and the base and table have ample coolant capacity. The American Tool Works Co.

Circle 51 on postcard for more data

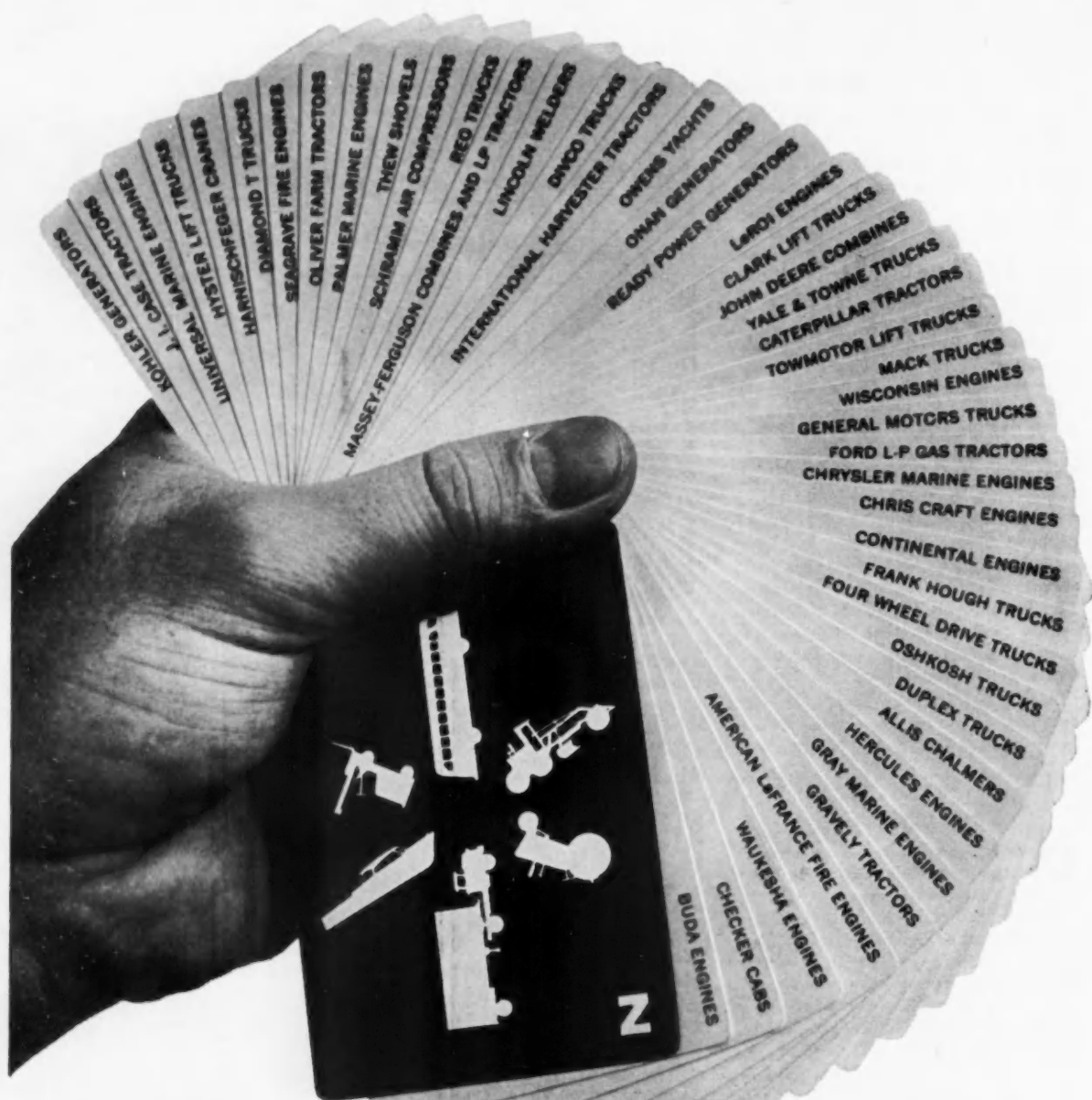
(Turn to page 130, please)

## Drilling Operation from Solid to Depth of 20 Inches



Illustrated here is a deep hole drilling application on a track roller shaft for heavy earth moving equipment. The workpiece is forged from SAE 1045 steel. This operation requires 11/16 in. dia hole, 20 1/2 in. deep to be drilled in one pass. This drilling process proved to be an economical and fast method. The Ex-Cell-O Corp.

Circle 53 on postcard for more data



## PICK A NAME—ANY NAME...

**You can benefit—as they have—from the experience behind Zenith® Carburetors**

Yes, our experience can be of great value to you. Zenith has designed and built carburetors for more different types of equipment than any other manufacturer. Our background is "heavy" in both gasoline and LP. It includes trucks, tractors, buses,

stationary engines, off-the-road equipment, boats and even fire engines.

Let us help with your applications by drawing from our extensive reservoir of problem-solving experience. Jot down the salient features of your current requirements and call us for a recommendation. Write to Zenith Carburetor Division, 696 Hart Avenue, Detroit 14, Michigan.

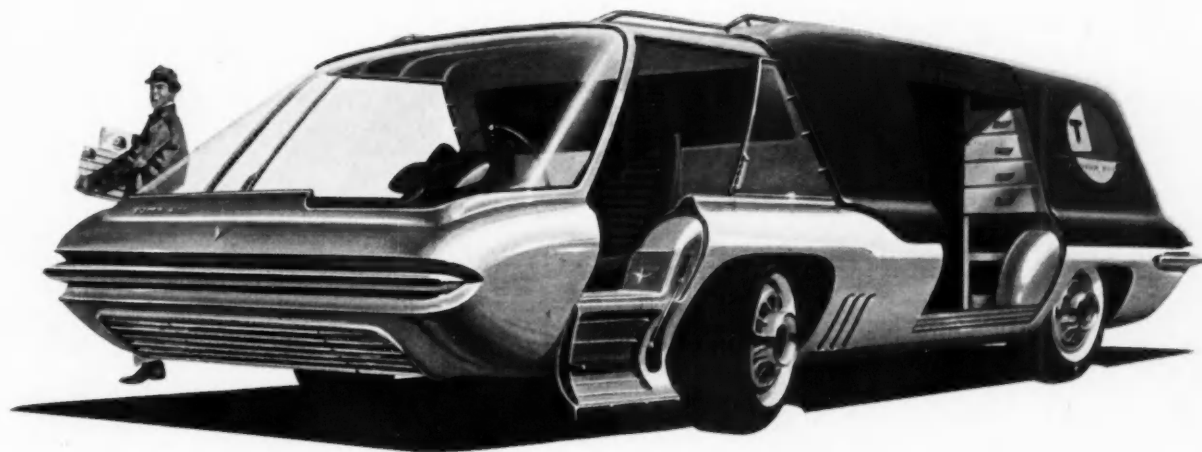
**Zenith Carburetor Division**  
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# stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like  
stainless steel for  
**THE AUTOMOTIVE INDUSTRY**



McLouth Steel Corporation,  
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*Manufacturers of high quality  
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Look for the **STEELMARK**  
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## McLOUTH STAINLESS STEEL



# Presenting!

## NATIONAL BUD UNITIZED

TRADE MARK

Flanges, if desired, are available to simplify positioning and removal



National BUD UNITIZED has integral wear ring presenting rubber surface to shaft. Wear ring turns with shaft, sealing lip is never exposed to damage, cannot score shaft.

### A new unitized oil-seal-and-wear ring that eliminates:

**SHAFT WEAR OR SCORING**

**SEPARATE METAL WEAR SLEEVES**

**EXPENSIVE SHAFT FINISHES**

**COSTLY SHAFT RE-MACHINING**

**SEALING LIP INSTALLATION DAMAGE**

**SPECIAL INSTALLATION PROCEDURES**

New National BUD UNITIZED seals are now in production, in a limited range of sizes, for heavy oil and grease sealing applications — including truck, bus and tractor uses. Still newer BUD UNITIZED seals are on the way for higher speed automotive and similar uses.

Changing a National BUD UNITIZED oil seal automatically changes the wear sleeve — in one fast, simple operation. Since the seal has its own integral

wear ring, it is almost impossible to install it other than squarely on the shaft. Expensive shaft finishing is no longer a necessity, nor is leakage under a metal wear ring a problem — both thanks to the rubber surface BUD UNITIZED presents to the shaft.

For complete details or skilled engineering help on application of BUD UNITIZED seals, write direct, or call your National Seal Applications Engineer. You'll find him in the Yellow Pages, under Oil Seals.

### NATIONAL SEAL

Division, Federal-Mogul-Bower Bearings, Inc.  
General Offices: Redwood City, California  
Plants: Van Wert, Ohio, Redwood City  
and Downey, California



6013-R



Blood Brothers  
Drive Assemblies help give  
power "pay-off" in

# TOUGH HOUGH PAYLOADER®

Many outstanding improvements have made this Hough Model H-90B Tractor Loader a proven leader in its field. Available with 1½, 3 and 5 cubic yard capacities, it offers a full 50° bucket-dumping angle, plus maximum lifting height and reach for loading large hauling units.

The lower-front drive shaft and lower-rear drive shaft used on this latest equipment were manufactured to exacting specifications by Blood Brothers. It is typical of the many quality drive assemblies Blood Brothers furnish for special equipment of all sizes.

Rockwell-Standard's Universal Joint Division offers a wide range of specialized engineering experience — involving everything from manual steering assemblies . . . to power take-off drives . . . to heavy-duty propeller shafts.

If you are planning or designing new equipment, consult our engineers for important savings in time and money. A letter or phone call will bring cooperative, friendly, experienced assistance.

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Universal Joint Division, Allegan, Michigan

ROCKWELL  
STANDARD

# NEW

# PRODUCTS

## AUTOMOTIVE-AVIATION

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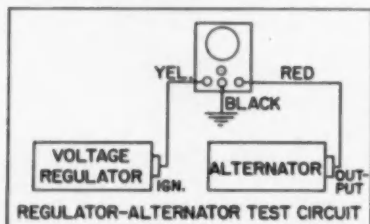
By C. J. Kelly  
ASSISTANT EDITOR

### Alternator Tester

A new automotive AC alternator tester, model 60B6-1-A, is the final result of an extensive development program by engineers and technicians at the Red Bank Division of Bendix. This instrument is designed to test all phases of the alternator units that were introduced on some 1960 automobiles. Two of the leading automobile manufacturers approached Bendix to develop this device since they intend to install alternators on their 1961 automobiles.

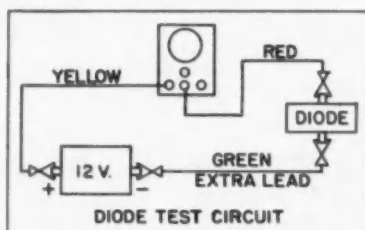


This testing unit enables the operator to obtain an accurate test of the six diode rectifiers for opens or shorts. By reading the various designations on a color coded meter scale the correct condition of the diode rectifiers can be ascertained. The output voltage and the voltage regulator can be tested by means of a panel mounted flip switch. The scale for these tests is also color coded.



With the switch put in the voltage regulator position, the actual output voltage of the alternator can be determined. If the pointer registers in the "green" on the regulator scale of the meter, the voltage regulator is adjusted correctly. If the pointer

registers in the "red" on the regulator scale, the voltage regulator is improperly adjusted or should be replaced.



If the above tests have determined that there are either open or shorted diodes in the alternator, the separate lead furnished with the tester is employed to individually test each diode. This extra green lead is used to connect the negative terminal of a 12-volt automotive battery to one side of the diode, while the "red" lead of the tester is connected to the positive terminal of the battery. With the switch in the voltage regulator position, the "black" or ground lead of the tester is applied to the other end of the diode. The Red Bank Div., Bendix Corp.

Circle 73 on postcard for more data

### Vinyl-Metal Laminate

An extensive research program has culminated in the development of a new system for laminating vinyl to metal. This system produces a laminate that can be worked to severe configurations, and permits exposure to elevated temperatures without delamination. Forming this material requires no considerations beyond that which is normally given to sheet metal. This laminate has been named Clad-Rex 102. It can be formed as deep as 9 to 1 ratios. (The 9 to 1 ratio is the depth of draw compared to the corner radius; that is, if the corner radius is 1 in., the material can be drawn 9 in. deep.) After forming, Clad-Rex can be pinch trimmed or model trimmed without any adverse effects on the vinyl. In testing this material for heat resistance qualities, it was sub-

jected to 200 deg for four hours and successfully withstood this heat. Clad-Rex is being produced in a new, modern plant which cost a half million dollars and has 50,000 sq ft of floor space. This new plant represents a 250 pct increase in production facilities. Clad-Rex Div., Simonize Co.

Circle 74 on postcard for more data

### Porous Nylon

Porous nylon parts which absorb 15 to 50 pct of oil by weight are claimed to hold the oil under extremes of pressure, temperature and acceleration. Approximately 20 pct of the oil is retained even after centrifuging at 15,000 G's. The nylon components, known as micro-porous Nylasint 64HV, are formed by cold pressing and sintering specially processed nylon powders by techniques similar to those used in powder metallurgy. The oil-filled parts are claimed to operate for very long periods at a frictional coefficient as low as 0.01. Applications for this material include bearings and wear parts where low frictional lubricated surfaces must be maintained over indefinite periods without subsequent lubrication. The new nylon parts can be used at PV's (pressure x velocity) of 40,000 to 70,000, according to the manufacturer. The Polymer Corp.

Circle 75 on postcard for more data

### Pipe Heaters

A development made available after exhausted field tests is called Pipe Thermaheaters. These are specially designed heaters for valves, reducers, tees, crosses and special pipe assemblies, and can be furnished with explosion-proof boxes. These heaters are cast aluminum of special construction and can be applied on cast iron or stainless steel pipe up to 20 in. pipe size. All sizes, shapes, voltages and practical wattage can be supplied. Thermel, Inc.

Circle 76 on postcard for more data

## Ball Bushings

New ball bushings, designated INST-258 and INST-396, are for use on shaft diameters of 0.1246 and 0.1871 in. Overall dimensions are: OD—0.3125 in., length—0.5 in. and 0.375 in. and 0.562 in. respectively. They weigh only 0.15 and 0.30 oz. Despite small size, each bearing contains three complete ball circuits with each circuit containing 16 balls in the smaller and 17 balls in the larger ball bushing. Fabrication of precision ball circuits in this miniature size was made possible by the development of special milling techniques, using a 16 to 1 pantograph ratio. According to the manufacturer, these bushings possess all of the supersensitive characteristics of the larger and heavier instrument quality bushings. In addition, they are extremely rugged in construction and capable of withstanding high vibrational and shock loads. The precision manufacturing techniques, combined with the antifriction rolling design, assure minimum status and rolling friction together with a high degree of reliability and repeatability. *The Kotula Co.*

Circle 77 on postcard for more data

## High Quality Battery

A new light utility battery, with aircraft-quality components, has been designed for use with miniature cars, motor scooters, riding-type lawnmowers, garden tractors, small stationary engines, and similar applications. It has been named the Autolite LU-7. Aircraft-quality construction features of the new battery type include: one-piece cover for longer battery life, corrosion-protected intercell connectors, special separators for starting efficiency and long-life, hard-rubber case, and aircraft battery positive and negative plates. *The Electric Autolite Co.*

Circle 78 on postcard for more data

## Sealing Grommet

A 'hook-in,' 'snap-in,' 'stay-put' cellular sponge plastisol which can be molded to suit any required situation, in any size, shape or dimension and can be produced as a production item at an amazingly low cost factor, the manufacturer reports. Its design with spring steel retaining tabs insures positive seal between grommet membrane and sheet metal. The fact that it will neither deteriorate in heat

or cold and further lend itself to any specified shape for safe and positive insulation around wires, conduit tubes, pipe, loom or cable makes it most flexible. Not only having positive corrosion and electrical insulation properties it is non-absorbative and prevents chafing, cutting, shorting and rattling. Readily removed and replaced to position without injury it provides protection for ragged edges of blanked holes and offers an unusually high degree of efficiency in eliminating sound and vibration, plus positively sealing out water, moisture, mud, dust gases and fumes, according to the manufacturer. *Automotive Rubber Co.*

Circle 79 on postcard for more data

## Battery-Electric Car

A new one-battery electric car that seats one man and his equipment has been introduced for in-plant transportation. It weighs 181 lbs, has a low center of gravity and a safe speed limit of 4½ miles per hour, and operates with accelerator and foot brake. It is just 35 in. wide. The Birdie car is suggested for plant executives, supervisors, maintenance men, messengers, spot checkers and other personnel required to move regularly from one place to another



within a plant. A big heavy-duty battery powers the Birdie car for 10 miles. Each car contains its own charger and can be recharged overnight. No special wiring is necessary; simply plug in any outlet. The Birdie car is driven by a single rear wheel, thereby eliminating heavy transmissions and differentials; there are relatively few parts to maintain. The car has a direct belt and chain drive for complete control. *The Birdie Co., Inc.*

Circle 80 on postcard for more data

## Speed Regulator

NAMED the RC-2, an electric vibrator with a companion speed regulator unit for regulating both vibration frequency and impact intensity has been designed. The twist of a dial on the speed regulator varies frequency of vibration from 1500 to 9000 vibrations per minute, with an impact range of 9 to 300 lb. According to Cleveland the vibratory impact and speed changes are both fast and accurate, and the speed regulator unit can be conveniently installed even when the vibrator itself is in accessible. The new device is designed for moving or settling materials wherever vibratory force must be quickly regulated and accurately controlled. The separate speed regulator unit of heavy steel may be mounted in any position to suit the operator. A convenient built-in fuse prevents vibrator burn-out caused by overloaded or short circuits. Both "on-off" switch and speed regulator dial are clearly marked for simplicity of operation. *The Cleveland Vibrator Co.*

Circle 81 on postcard for more data

## Cooling System

Cooling systems for non-radiator cooled engines have been developed to maintain a high-velocity, high volume coolant flow to produce more uniform engine temperatures. With this unit hot spots and steam pockets are eliminated, and foaming and entrainment problems, inherent with continuous duty applications, are controlled. It has been named the Flo-Matic, and is available for three V-8 and three 6 cylinder engines in the manufacturer's line. They are the UV-401, UV-461 and the UV-549 for the V-8's and the UR-372, UR-450 and the UR-501. Other units in the company's line will be included in the near future. *The International Harvester Co.*

Circle 82 on postcard for more data

## Magnetic Rack

Conveyor lines at the Chrysler assembly plants have a new rack which was developed to replace 77 different styles of hangers. This rack has 24 magnets welded onto its rectangular frame. The rack will handle parts ranging from small trim molding to 36 lb floor pans, and is reported to process up to 38,000 parts per day. One of the major advantages of the new racks is their ability to support parts on any point of contact. *Chrysler Corp.*

Circle 83 on postcard for more data



## Cooling off hot problems — 24 successes in 24 attempts...and ready for the 25th

Automotive air conditioning manufacturers have come to think of us as helpful control specialists in their highly specialized field.

Since 1953 that's been the case. Our engineers have been on the "hot spot," ironing out car air conditioning control and systems bugs in a hurry.

This same veteran technical task force has come up with 24 new cool-working solutions . . . designing and building thermostatic expansion valves, pressure regulators, drier-receivers and distributors shown above.

Whether a single component or the complete control package is the hot problem in your auto air conditioning, we'd like to make it our 25th challenge. And you get the follow-up economy of high-volume production plus the convenience of coast-to-coast jobber coverage for future replacements.

A note on your letterhead will bring fast action from Controls Company of America, Milwaukee 10, Wisconsin.

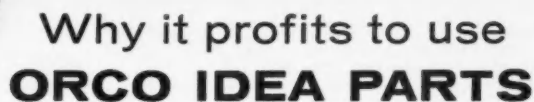
*These independent automotive air conditioner and automobile manufacturers rely on Controls Company of America:*

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## "CUSTOMEERED COMPONENTS BASIC TO INDUSTRY"



## 93

# Expanded Test Facilities at Dana's New Laboratory

By Joseph Geschelin

DETROIT EDITOR

**A**N Experimental Laboratory expansion program under which space alone has been increased nearly three times has been completed at the Toledo, Ohio, headquarters of Dana Corporation.

Dana's corporate Experimental Laboratory not only tests and evaluates newly-designed products, but also all major changes in existing products before they are incorporated in production, thus es-

tablishing the quality and capability of the parts and components manufactured for the automotive industry in five of the company's 12 divisional plants.

The new Experimental Laboratory contrasts in size with the old 41,020 to 14,000 sq ft, and includes mechanical and metallurgical sections, both complete and up-to-date in every detail.

It supersedes a laboratory that was completed in 1940 and that remained reasonably sufficient for required work until recently when the company's sales volume shot upward and testing facilities became taxed to the point where expansion was imperative.

Also contributing to the need for substantial expansion was a sharp rise in research and development work, until after World War II conducted by Dana only on a very modest scale.

At the beginning of this year, Dana's Research and Development Group was greatly expanded and now this work comprises an appreciable percentage of total engineering cost and laboratory utilization.

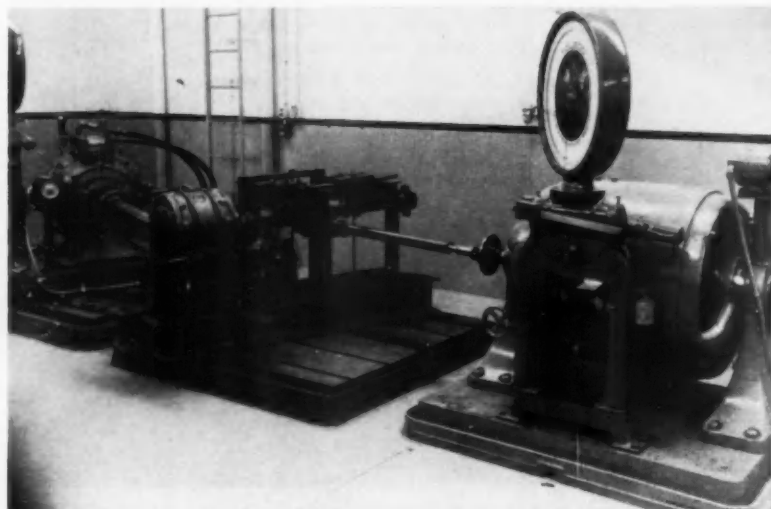
Considerable planning time was devoted to the new Experimental Laboratory setup. Removal of one company division from the main Toledo plant complex to its own detached building opened up an ideal area for greatly expanding mechanical and metallurgical laboratory facilities.

The new layout provides a ground floor, one-level operation. It is located on a naturally lighted (during the daytime) area, with modern fluorescent lighting providing a level of about 75 foot-candles during the nighttime hours.

The area was completely refurbished, re-arranged, and in some cases rebuilt to adapt it to laboratory use. Most of the equipment in the old laboratory was in excellent condition—in a number of cases unique among automotive parts manufacturers.

This was retained and installed in the new area which, due to its greatly increased size, in addition provides ample room for much larger dynamometers and other specialized equipment for perform-

(Turn to page 104, please)



Dana manufactures parts and components for practically all elements of the transportation industry, not alone for passenger cars and trucks. In this illustration a dynamometer test of a rail car drive is in progress.



A section of the mechanical test area at the new Toledo Experimental Laboratory. Cycle fatigue testing machines appear in the foreground.

# GASKET SEALS VS. FLANGE FINISH

Smooth flanges usually help simplify gasket problems . . . but they raise machining costs. Can a gasket material compensate for flange roughness so well that machining costs can be reduced?

E. M. SMOLEY

Research Physicist  
Armstrong Research and Development Center

**H**ow smooth do flange surfaces in gasketed assemblies have to be? Is there a gasket that will seal so efficiently that reductions in flange surface smoothness might be practical?

To answer these questions, extensive tests were conducted at the Armstrong Research and Development Center, using rough (3000 micro-inch) and smooth (5 micro-inch) flange finishes.

Two different gasket materials were compared: one, a standard grade of

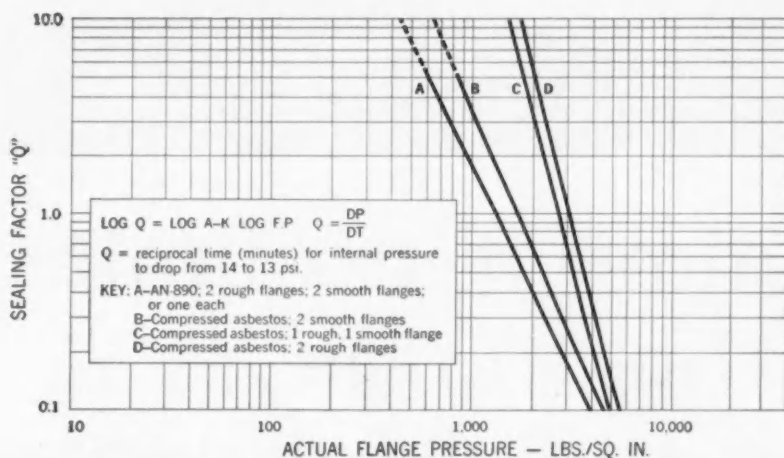
air leakage tester developed by Armstrong engineers.

Many individual tests were run, using two smooth flanges, two rough flanges, or one of each. The results are condensed on the chart below.

The curves show that AN-890 has far better sealability with either rough or smooth flanges — or one of each — than the compressed asbestos material. Even at the relatively low flange pressure of 1000 psi, the unusual sealing ability of AN-890 is evident.

is a more compressible material. As a result, it has unusual conformability to flange irregularities.

These tests indicate that Accopac AN-890 offers definite promise of efficient seals at higher micro-inch flange finishes. This can represent a

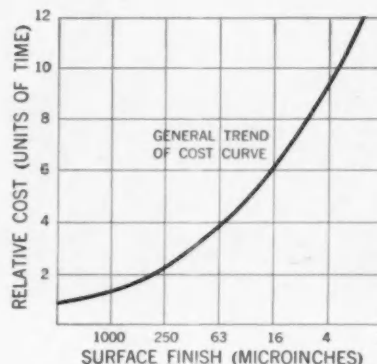


Condensed results of sealing tests on smooth (5 micro-inch) and rough (3000 micro-inch) surfaces. Sealing efficiency plotted along vertical axis, with lowest point representing best seal. Example: At 1000 psi flange pressure, Accopac AN-890 (A) has a sealing factor of about 1.8; Curve B, a factor of about 3.6; other curves are off the chart. All testing done at room temperature.

compressed asbestos; the other, Armstrong Accopac AN-890, a beater-saturated rubber-asbestos material. Both were 1/32" gauge.

In each test, air was locked in gasketed flange assemblies at an internal pressure of 14 psi. Then pressure loss was measured and recorded as a function of time by the electro-mechanical

The superior performance of AN-890 is a result of the way it's made. The patented beater-saturation process gives a more uniform dispersion of rubber on fiber — hence, AN-890



As micro-inch finish is reduced, machining costs climb more and more steeply. (Chart: Machine Design.)

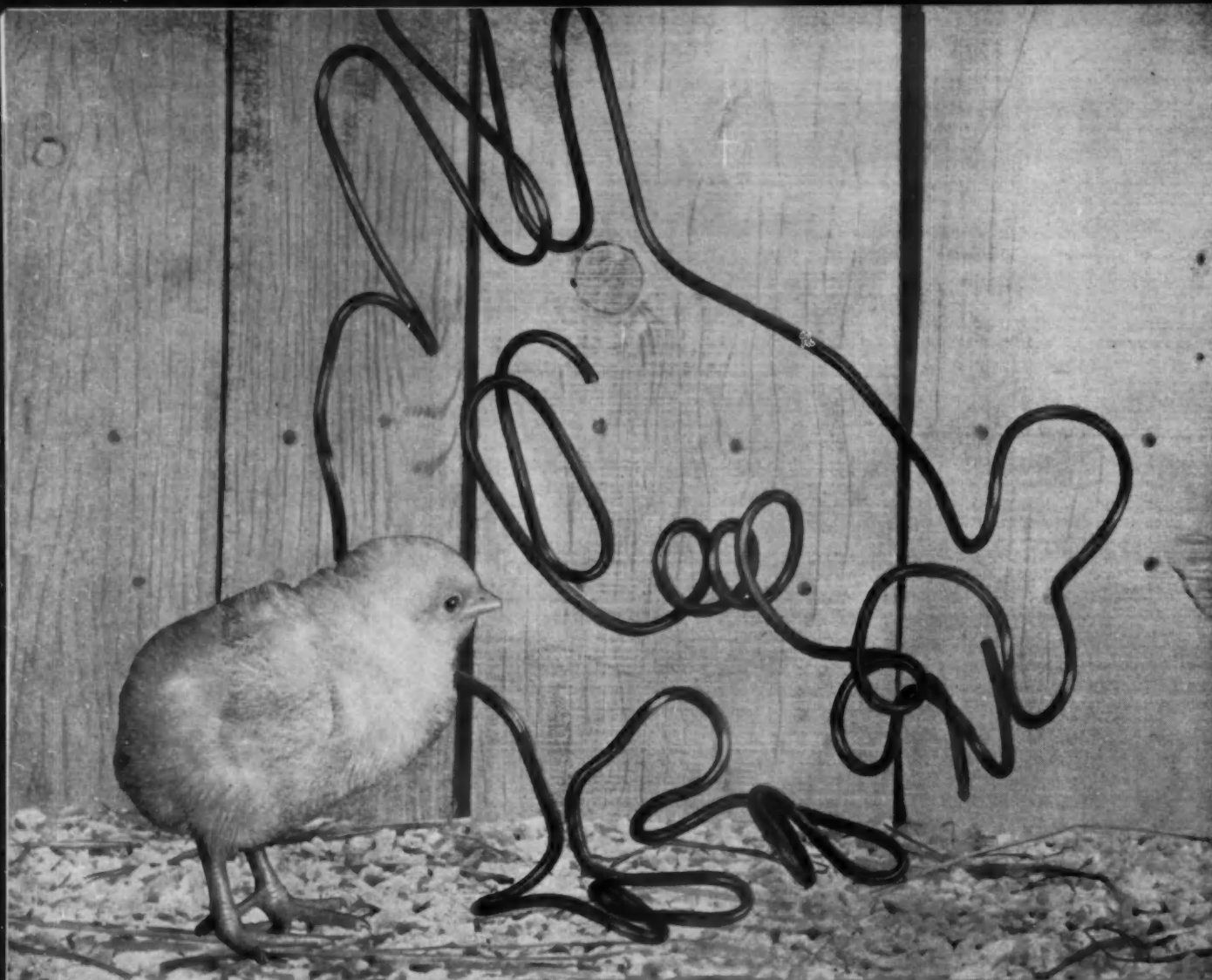
potential saving in machining costs that is well worth considering. We would be glad to discuss specific applications with you.

If you do not already have a copy of the Armstrong Gasket Design Manual, send for it today. It contains much data on the selection and design of resilient gasket materials. Address your request to Armstrong Cork Co., 7109 Imperial Ave., Lancaster, Penna.



## Armstrong GASKET MATERIALS

1860-1960 Beginning our second century of progress



# There's almost no limit to the things Bundy can mass-fabricate



Bundyweld is the original tubing double-walled from a single copper-plated steel strip, metallurgically bonded through 360° of wall contact for amazing strength, versatility.

Bundyweld is lightweight, uniformly smooth, easily fabricated. It's remarkably resistant to vibration fatigue; has unusually high bursting strength. Sizes up to  $\frac{1}{2}$ " O.D.

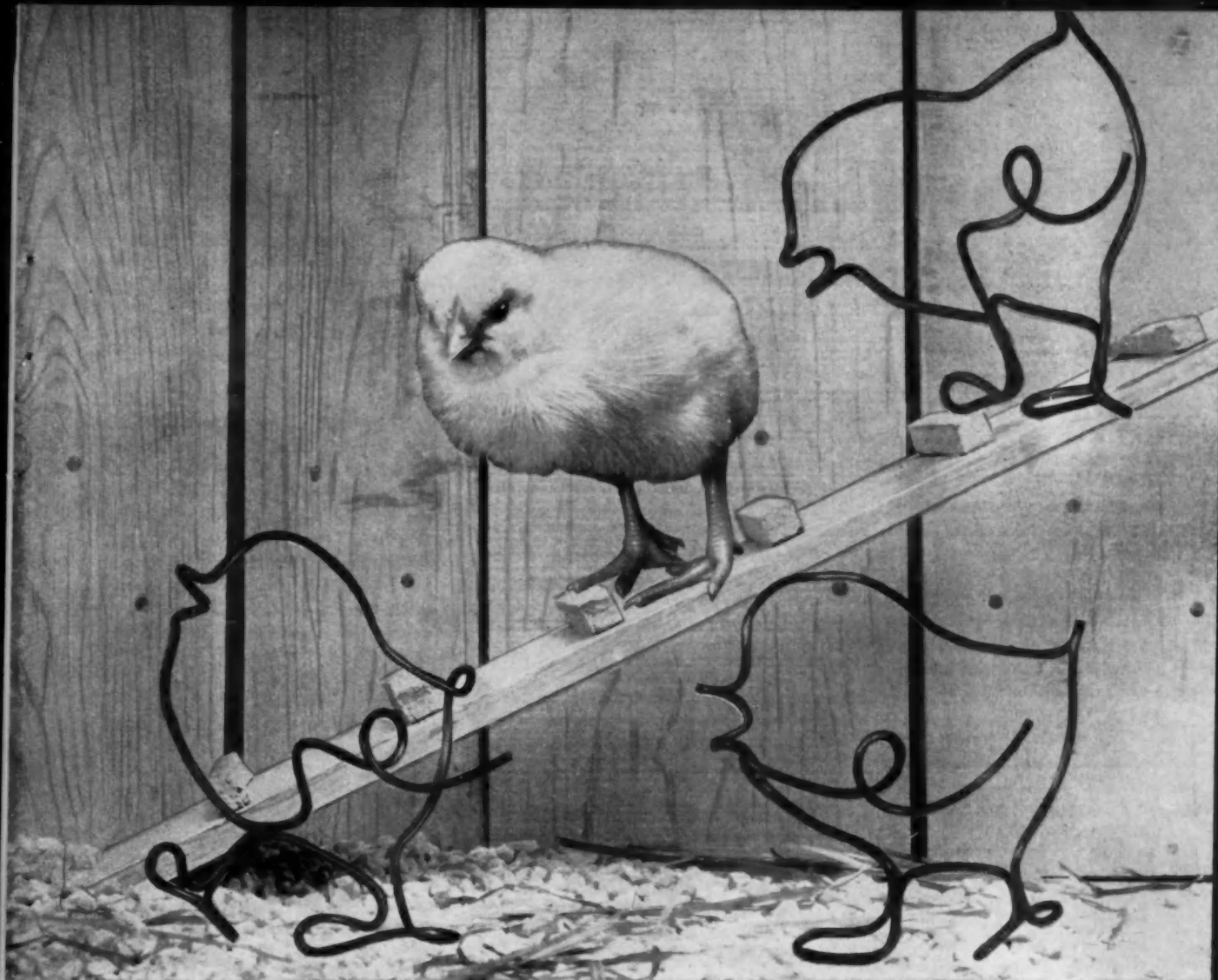
The old adage, "Don't count your chickens before they hatch," is a good one . . . but it rarely applies to Bundy. That's because, no matter how complex your tubing problem, you can count on Bundy for the perfect solution.

Bundy engineers and designers are backed by years of experience in the mass-fabrication of steel tubing. And they are available to you at any stage of product development for time- and money-saving suggestions. Their key: Bundyweld®!

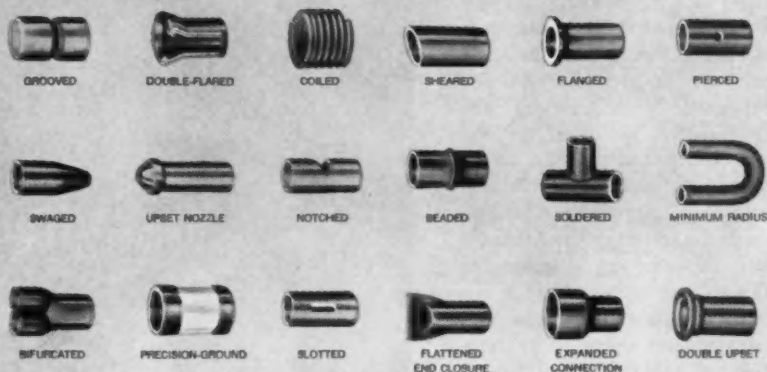
Bundyweld steel tubing is double-walled, copper-brazed, leak-proof by test. Used on many applications in most of today's cars, Bundyweld is the tubing standard of the automotive industry. Meets ASTM-254 and Government Spec. MIL-T-3520, Type III.

So, when you want to talk tubing, talk to the leader—Bundy! Phone, write, or wire Bundy Tubing Company, Detroit 14, Michigan.





No matter what type of mass-fabrication you require, Bundyweld may be your answer. Shown here are just a few tubing operations designed and fabricated by Bundy—many for use in the automotive industry.



*There's no substitute for the original*

## BUNDYWELD® TUBING

WORLD'S LARGEST PRODUCER OF SMALL-DIAMETER TUBING • AFFILIATED PLANTS IN AUSTRALIA, BRAZIL, ENGLAND, FRANCE, GERMANY, ITALY, JAPAN

BUNDY TUBING COMPANY • DETROIT 14, MICH. • WINCHESTER, KY. • HOMETOWN, PA.

Circle 145 on Inquiry Card for more data

# Making Hydraulic Cylinders at Allis-Chalmers Plant

**M**OST of the actuation of construction equipment makes use of hydraulic systems. Because there are four or more hydraulic cylinders on each motor scraper, the Construction Machinery Division's Cedar Rapids, Ia., works of Allis-Chalmers Mfg. Co. must produce hundreds of these devices for power application. Facilities for their production show some unusual engineering skill in converting standard machines to special applications for high output.

The hydraulic cylinders are made of cold drawn steel tubing. SAE 1015 to 1025 steel is used. Piston rods are of SAE 1045 steel bar stock.

For the cylinders, the tubing is first cut off to length and chamfered. The parts of the cylinder, which will include a head and a base flange, and may include a trunnion flange, are tack welded by the manual arc process to the tubing. The tack welded assembly is then ready for permanent welding.

Welding of the cylinders is done by the submerged arc process on a machine converted by company engineers from an old geared-down engine lathe. A submerged arc welding head is mounted on the carriage of the machine. To adapt the machine to rapid setup of open end cylinders, irregular flanges, and similar parts, the dead center has been replaced by a truncated cone. The dead center quill is attached to an air cylinder so that the operator can move it by tripping a valve. Many kinds of tubing weldments are made in this machine, including cartridge weldments used in the power train for motor scrapers. A chart is mounted on the machine to indicate the lathe speed setting for each diameter of tubing used so that the weld will

be made at the rate of about 50 in. per min. Circumferential welds are made at the cylinder head, base flange, and trunnion.

Some of the cylinders are bored and honed, and some are honed only. Those to be bored go to the horizontal boring machine and then to a horizontal hone on which the diameters are finished to a tolerance of  $\pm 0.005$  in. Those to be honed only are finished on a vertical honing machine.

Piston rods are cut to length from bar stock, a clevis or rod head is welded to the rod, and then heat treated. Next, they are rough and finish turned on a standard engine lathe, and the piston end is threaded. The surface is then ground to a smoothness of 32 microinches. The clevis or rod head is sometimes a steel casting, sometimes a jaw piece machined from

bar stock, or in some cases hot formed.

Piston rods are chrome plated to provide a smooth, long-wearing surface. At the A-C Cedar Rapids plant this is done in a separate department. The rods are first cleaned in an Oakite bath, rinsed in hot water, cleaned and etched in an acid bath consisting of a mixture of chromic and sulphuric acids, rinsed again, and are ready for the plating bath. A sheet iron guard is dropped over the rod to shield the jaw end, a hanger is placed over the threaded end to protect it and to support the rod in the bath, and chromium is electrodeposited for  $1\frac{1}{2}$  hr. This produces a film of bright metal 0.0015 in. thick. No flash plate of other metal is used under the chromium. The rods are then ready for assembly into the pistons and the cylinders.

Changes in the production lines for hydraulic cylinders are now under way. A new vertical hone will increase the speed of this operation and provide greater accuracy. A horizontally traversing table with two positions will make it possible to load one station while honing is being done on another piece. The cylinders will be end clamped to



An engine lathe is used to make circumferential welds automatically on hydraulic cylinders

avoid distortion from clamping. The machine will have a capacity of from 3½ to 8 in. diameter, and will be capable of honing cylinders to 68 in. in length. If the weldment design is such that original distortion may be great, as when a center trunnion weld is made, the cylinder will be bored before honing. If the eccentricity of the interior surface is not great, honing will be done directly on the interior without machining. Metal removal to about 0.035 in. on the diameter will be accomplished by the honing operation. An automatic sizing gage on the machine shuts off the machine automatically when the workpiece is down to size.

For the piston rods, a precision centering machine will center the rods to within 0.002 in. The machine is capable of taking work to 90 in. in length, and will be used for head shafts also. The rods will be turned on a tracer lathe in which multiple tools will reduce turning time. The center will be turned down first, and then supported in an automatic centering steadyrest while two tools turn down the rod from both end and center simultaneously. Concentricity will be held within 0.002 in. Cycling of cut and feed are automatic. A centerless grinder with a wheel face of 20 in. will first plunge grind the first 20 in. of length down to size, then feed the rod to grind the remainder of the surface in the usual way. This is necessary because the clevis welded onto one end of the rod would make the usual end-to-end feeding of the work impossible. ■

### **Nike Hercules Kit Makes Missile Mobile**

Field armies will add the Nike Hercules air defense guided missile to their arsenal of mobile weapons, the Army has announced.

Formerly tied to relatively fixed positions, the 39-ft long surface-to-air missile is now mobile with the addition of a new field installation kit to be produced by Douglas Aircraft Co.

With its new mobility, the Hercules will give field armies a high altitude defense capability and will

supplement the Hawk, a low-level surface-to-air killer.

The kit to be produced by Douglas consists of a blast deflector and

its tie-downs, hydraulic jacks and outriggers, and a removable undercarriage for transporting the launcher.

## **Meet the AI By-Liners**



**A brief biographical sketch of one of the editors and contributors to AI who participates regularly**

### **Introducing Robert P. Homer**

**R**OBERT P. HOMER is one of the "unsung" major contributors to **AUTOMOTIVE INDUSTRIES**. Except for listing on the staff, his name does not appear in the publication. Nevertheless, in his capacity as Editorial Production Manager, Bob plays an essential and highly-important part in every issue of AI.

Bob heads up the art, layout and presentation of AI feature articles, and is responsible for creating their attractive clean-cut look. He also puts the whole "book" together, and finalizes the many facets of producing the end product.

A veteran of 12 years with AI, Bob's on-the-job experience alone qualifies him as a top man in his field. His prior work as commercial artist and photographer, editor of several industrial publications, and assistant advertising manager, gives him an extremely well-rounded background for managing the magazine's editorial presentations.

Bob attended the Wharton School of the University of Pennsylvania, graduating in 1933 with a B.S. degree in Economics. He majored in advertising, merchandising and salesmanship. He is also a graduate of the Philadelphia Public Industrial Art School.

During World War II, he served in the 33rd General Hospital Unit, U. S. Army Medical Corps, for four years, stationed in Africa and Italy. Even while in the Army, and upon de-activation of his medical unit, he was engaged in editorial work with the Information and Education Section, becoming feature editor of the Army's base newspaper at Leghorn, Italy.

Besides being active in several community organizations, Bob is an accomplished violinist in amateur symphony orchestras, as well as public speaker. His big personal interest and hobby is model railroading—which he utilizes to the delight of hundreds of children annually by putting on, at his home in Lafayette Hill, Pa., what he calls "Uncle Bob's R.R. Show."



## Chrysler 1961

(Continued from page 59)

a moderate price. The range of models is given in the table; all Polara station wagons have four doors and hardtop styling. Stainless steel is used generously in buffed finish at the following points: body side moldings, roof drip rail, door upper reveal (4-door sedan), windshield reveal, door edge moldings, rear window reveal, lower deck and quarter panel moldings.

Wheel covers, too, are of stainless steel, chromium-plated. Radiator grille and head lamp bezel are anodized aluminum stampings.

Chromium-plated zinc die-castings are used for the tail lamp bezel, grille medallion, D-500 medallion, Dodge nameplates and Polara script, door handles, tail-gate handle, station wagon tail-gate assist handles, rear license frame, back-up lamp bezel, fender medallion.

Dodge Dart pick-up truck highlights the 1961 Dodge truck line,

featuring a choice of three different powerplants. The standard engine is the 225-cu in. Six with maximum gross bhp of 140, @ 3900 rpm, maximum torque—215-lb ft @ 1600-1800 rpm. Supplementing this is the optional 170-cu in. Six, rated 101-bhp (max.) @ 4000 rpm, maximum torque—145-lb ft @ 1600-3200 rpm. This engine is offered primarily to truck owners operating delivery services involving long idling time. For operators who want exceptional performance there is an option of the 318-cu in. V-8, rated 200-bhp (max.), and maximum torque of 286-lb ft.

The new heavy duty manual transmission is standard on this vehicle with the following gear ratios: first, 3.02; second, 1.76; third—direct; reverse, 3.95. Optional transmissions include—a four-speed synchromesh, and the three-speed LoadFlite.

Highlight of chassis arrangement is a forward type steering gear, mounted back of the front axle increasing the angle of the column and providing a more horizontal position of the steering wheel. Steering effort is said to be reduced some 60 per cent as a result of the new geometry, wider tread, and higher steering ratios.

Body mounts are electronically engineered to eliminate vibration. Longer and wider front and rear leaf springs with fewer leaves are aimed at lower spring rates for a better ride. Springs are wider spaced to provide greater stability and increased roll resistance. In addition, the springs are mounted in rubber-bushed shackles to absorb road shock and eliminate need for lubrication.

A new drop-center frame is employed in keeping with the styling and arrangement of the new cab, contributing to a lower center of gravity and cab position.

The Dart pick-up is seven inches lower and four inches wider than former Dodge pickups, although ground clearance remains the same—8 1/16 in. Incidentally, the wider cab permits use of a 60-in. seat cushion.

Express bodies have been completely redesigned in keeping with the new styling theme. Box width has increased by four inches,

## Now - a decorative ACORN TYPE

added to the line of

## PALNUT®

## Self-threading Nuts



- Protects against scratching
- Pleasing appearance
- Provides vibration-proof assemblies

Where exposed studs can not be tolerated (for example, in trunk areas) the new Acorn Type Self-threading Nuts not only eliminate the cost of threading, but the smooth contour automatically covers up studs which may otherwise damage articles or scratch hands. Sizes for 1/8", 5/32" and 3/8" dia. studs and rod. Get details and free samples.

### Big Savings in Parts and Assembly Costs

Low-cost PALNUT Self-threading Nuts eliminate threading of parts because they form their own clean, deep threads while tightening on unthreaded studs, rods, wire and plastics. They assemble fast with standard power tools, even on off-angle studs and in confined spaces. Spring-tempered steel prevailing torque holds tight, whether seated or unseated. May be used and re-used on the same stud. Widely used on ever-increasing automotive applications.

### THE PALNUT COMPANY

DIVISION OF UNITED-CARR FASTENER CORPORATION

60 Glen Road, Mountainside, N. J.

District Office: 730 W. Eight Mile Rd., Detroit 20, Mich.



**MAKE THEIR OWN THREADS**  
on unthreaded studs, rods, pins,  
etc. of any malleable materials



#### Other Types Available: WASHER TYPES



Style SD, large base



Style SD, small base



Grounding Style SG



Washer with Sealer



REGULAR TYPE  
Style SR

• Write for Free Samples and Bulletin 585

**LOCK NUTS and FASTENERS**



boosting volumetric capacity by some 13 per cent.

A full-width, flat hood, opening 90 deg to an upright position, provides excellent accessibility for servicing. ■

## Leyland Trucks

(Continued from page 67)

can be added to the gearbox if desired.

Final drive of the single-axle trucks employs an extra large pinion to reduce stress on this critical component, and double-reduction hubs. There are three alternative overall ratios. Tandem drive vehicles use similar axles, except that the leading one incorporates the third differential which can be locked by an air-operated mechanism controlled from the cab.

Power-assisted steering is standard, and utilizes a hydraulic ram linked to the drop arm on the cam and double roller gear. The control valve is built into the steering box, and includes a release valve to permit free oil circulation through the booster should hydraulic pressure fail.

Air brakes have the diaphragm unit integral with the foot pedal. The system is pressurized to 100 psi, and progressive braking action is directly proportionate to pedal movement. The hand brake is pneumatically assisted, using a pull-type valve in the primary linkage that actuates a diaphragm chamber acting directly on the brake cross shaft. ■

## Comet for 1961

(Continued from page 63)

increased rigidity.

Although styling remains the same, there are some detail changes in exterior ornamentation. One of these is a new front grille, a one-piece aluminum stamping. The dual headlamps have been moved forward and have individual stamped aluminum bezels.

The overall ratio of 27 to 1 together with a 4.6 turn lock-to-lock afford easy steering.

An emission-reduction crankcase ventilation system is available as an option when specified. In addition, a dealer-installed air conditioning unit is offered. ■

**HUCK fasteners**

CL DR  
PT OS  
MLS

**for SPEED,  
ECONOMY,  
DEPENDABILITY**

HUCK gives you MORE than "just a fastener". Huck's foolproof installation tools, convenient power units and versatile fasteners give you uniformity and speed of installation beyond your fondest hopes, even with inexperienced operators. Savings of up to seventy per cent on installed cost have been obtained by many users of Huck fasteners.

There is a HUCK fastener to meet your specific requirements whether they be high tensile or shear strength, blind application, thin sheets, wood-to-metal, broad bearing area, flush installation, high clinch, positive mechanical lock, elevated temperature, corrosion resistance or speed of application. A phone call can save you important production dollars. It costs you nothing to find out.

We invite your inquiries.

**HUCK** MANUFACTURING COMPANY

2480 Bellevue Avenue • Detroit 7, Michigan • Phone WA 3-4500

## More Government Contract Awards

**L**ATEST contracts awarded by various Government agencies, and covering primarily automotive and aviation products, are listed in the following. Typical of the items contained in these monthly listings are: passenger cars, motor trucks, aircraft, military tanks, engines, transmissions, other components, spare parts, plant equipment, etc. This list is for the period July 28 to Aug. 29 inclusive.

**ALASKA SALES AND SERVICE, Anchorage, Alaska**  
Auto Parts Alaska—*indefinite quantity*

**THE AMERICAN CAR AND FOUNDRY DIV. OF ACF INDUSTRIES, INC., Berwick, Pa.**  
Tank recovery vehicle, 212 ea—\$4,389,000

**AUTOMOTIVE PARTS & EQUIPMENT INC., Anchorage, Alaska**  
Auto Parts, Alaska—*indefinite quantity*

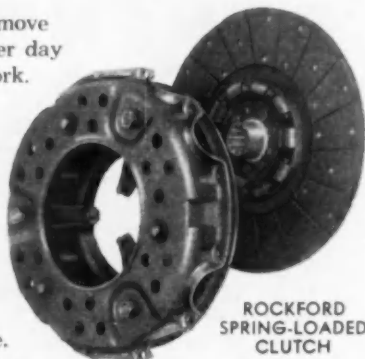
**B & C AUTO ELECTRIC, Anchorage, Alaska**  
Auto Parts, Alaska—*indefinite quantity*

**CHRYSLER CORP., Detroit, Mich.**  
Tank, combat, full tracked—\$2,000,000



## HAULING PROFITS UP with Rockford Spring-Loaded Clutches

Rockford Clutch equipped trucks move thousands of tons of limestone per day in construction and quarrying work. Here, higher power means higher profits. That's exactly what you get with Rockford Spring-Loaded Clutches—positive, full-motion driving power with cushioned starts and controllability. These rugged clutches are also used on haulers, loaders, graders, tractors and other vehicles where the clutch is in constant use. Write today for illustrated brochure.



ROCKFORD  
SPRING-LOADED  
CLUTCH

## ROCKFORD CLUTCHES

ROCKFORD CLUTCH DIVISION



BORG-WARNER

315 CATHERINE ST.  
ROCKFORD, ILLINOIS

Export Sales  
Borg-Warner International  
36 So. Wabash, Chicago, Ill.

**CINCINNATI MILLING AND GRINDING MACHINES, INC., Cincinnati, Ohio**  
Grinder, 1 ea—\$25,436

**CONTINENTAL MOTORS CORP., Detroit, Mich.**  
Engine Generator sets—\$224,576

**DeWALT DIV., AMERICAN MACHINE & FOUNDRY CO., Lancaster, Pa.**  
Sawing machine, 60 ea—\$46,230

**DOUGLAS AIRCRAFT CO., INC., Long Beach, Calif.**  
Aircraft spares, 50440 ea—\$42,368

**EIDAL MFG. CO., Albuquerque, N. Mex.**  
Trailer, chassis—\$680,889

**THE ELECTRIC AUTO-LITE CO., Toledo 4, Ohio**  
Battery, 6 volt, 27881 ea—\$273,791

**J. H. ELLIOTT CO., Washington, D. C.**  
Grinding machine, 3 ea—\$30,106

**FORD MOTOR CO., FORD INTERNATIONAL GROUP, Jersey City, N. J.**  
Sedans, 21 ea—\$8,844

**THE GALION IRON WORKS, Galion, Ohio**  
Road Roller, 3 ea—\$18,562

**GENERAL FORMING CORP., Harbor City, Calif.**  
Aircraft spares, 28100 ea—\$32,282

**GENERAL MOTORS CORP., CHEV. MOTOR DIV., Detroit, Mich.**  
Trucks, 127 ea—\$231,270

**GENERAL MOTORS CORP., FOREIGN DIST. DIV., New York, N. Y.**  
Sedans, 15 ea—\$35,104

**THE GENERAL TIRE AND RUBBER CO., Akron 9, Ohio**  
Aircraft tires and tubes, 5277 and 1811 ea—\$498,453

**HARVEY ALUMINUM INC., Torrance, Calif.**  
Piston assembly—\$494,868

**INTERNATIONAL HARVESTER EXPORT CO., Chicago, Ill.**  
Diesel tractor, 3 ea—\$12,885

**M & O AUTO PARTS AND EQUIPMENT INC., Fairbanks, Alaska**  
Auto Parts, Alaska—*indefinite quantity*

**NOBLE ST. MOTORS, Fairbanks, Alaska**  
Auto Parts, Alaska—*indefinite quantity*

**PITMAN MANUFACTURING CO., Grandview, Mo.**  
Truck, maintenance, 34 ea—\$567,190

**TIP TOP CHEVROLET INC., Fairbanks, Alaska**  
Auto Parts, Alaska—*indefinite quantity*

**WALTER MOTOR TRUCK CO., Voorheesville, N. Y.**  
Truck, 1 ea—\$36,950

**WALTER MOTOR TRUCK CO., Voorheesville, N. Y.**  
Truck-mounted snow plows, 5 ea—\$93,590

**WILLYS MOTORS INC., Toledo, Ohio**  
Trucks, 3229 ea—\$6,219,528

## MACHINERY NEWS

(Continued from page 80)

chasing such parts, and many small plants are being established to supply them.

### Around the Industry

Warner & Swasey Co.—during the first half of 1960 earned a net profit after taxes of \$1,922,770 on a product income of \$32,022,930. This compares with a net profit of



# \* new simplified controls

## FOR AIR BRAKES AND DIRECTIONAL SIGNALS

\* **Simplicity** is the keynote of these new unified air brake and directional signal controls for trucks. Developed by Ross Gear with the new ICC lighting regs in mind!

**Driver benefits:** Precise finger-tip lever control of brakes and signals. Eliminates cab clutter and fussy plumbing. Gives driver more leg room. Helps reduce fatigue. Increases efficiency and safety.

**OEM benefits:** Complete unit with color keyed wiring. Cuts installation time and costs. Accurate, dependable operation. Conserves cab space. Enhances interior decor.

Ross invites OEM inquiries.

**Ross**

# STEERING

(Copyright, 1960)

ROSS GEAR AND TOOL COMPANY, INC. • LAFAYETTE, INDIANA  
GEMMER DIVISION • DETROIT, MICHIGAN

\$2,296,383 on an income of \$28,953,714 in the first six months of 1959. Relative earnings per share were \$1.92 vs. \$2.31. "The figures," Walter K. Bailey, president, reported, "indicate that the 'profit squeeze' so commonly talked about is having an adverse effect upon the company's profit margin. There will have to be increases in the prices of our products to offset the steadily increasing costs."

E. W. Bliss Co.—Belmont Pinney has rejoined Bliss as assistant division manager of the Hastings

(Mich.) Division of the company. Between the years 1936 and 1947, he was employed at Bliss. Since then he has held the positions of production manager of the Equipment Mfg. Div. of Continental Can Co., manager of fabricated products of M. W. Kellogg Co., and executive vice-president of Copco Steel & Engineering Co.

**AUTOMOTIVE INDUSTRIES  
KEEPS YOU INFORMED**

## Expanded Test Facilities at Dana's New Laboratory

(Continued from page 94)

ing load life tests on all Dana products.

Dana's Experimental Laboratory operation is divided into a number of different kinds of work. Continuous product evaluation tests are of course among them. Before release of a new product, research and development tests are conducted to prove the soundness and practicability of new designs; also performance and durability.

After release of a new automotive part or component, its work centers upon product improvement and production cost reduction. The laboratory helps with the solution of field problems and cooperates with the manufacturing divisions in resolving quality control problems.

It also works with the plants on vendor approval, finding new sources for parts, materials, etc.

Functionally, the Dana Corporate Experimental Laboratory operates on an individual group basis, guided by the group engineers of the Engineering Department. This, management contends, among other things leads to completely unbiased reports and greater all-around efficiency.

The new facility is broadly divided into six sections, or subdivisions — garage, engineering sample order department, machine shop, test cells, metallurgy, and a general area.

Electronic work includes strain gage techniques, sound and vibration analysis, and test data recording. Equipment includes cathode ray oscilloscopes, visicorders, and tape recorders.

The engineering sample order group provides prototypes for Dana's own engineering test work, as well as for that of its customers. Manned by highly-skilled personnel, this section specializes in quickly producing needed samples.

Thoroughly capable of high-quality, short-order work, it is adequately supplied with basic turning, balancing, inspection, and assembly equipment.

Eight separate sound-conditions (Turn to page 116, please)

# MIRO-FLEX QUALITY LAMPS AND REFLECTORS



## NOW AVAILABLE FOR O. E. M.

For the best in original equipment — specify Miro-Flex truck, trailer, and tractor lamps and reflectors! Immediate delivery for O. E. M. — on all types of clearance lights, turn-signal and marker lamp assemblies, stop lights, and reflectors. Miro-Flex leads the way . . . for finest heavy-duty quality lamps and reflectors, at lowest cost! Send for free catalog of Miro-Flex lamps, reflectors, and safety equipment, today!

### FULL LINE OF SAFETY EQUIPMENT



Turn, Stop, and Tail Lights



Standard Mirror Assemblies



Heavy-duty West Coast Mirrors



The Original Miro-Flare

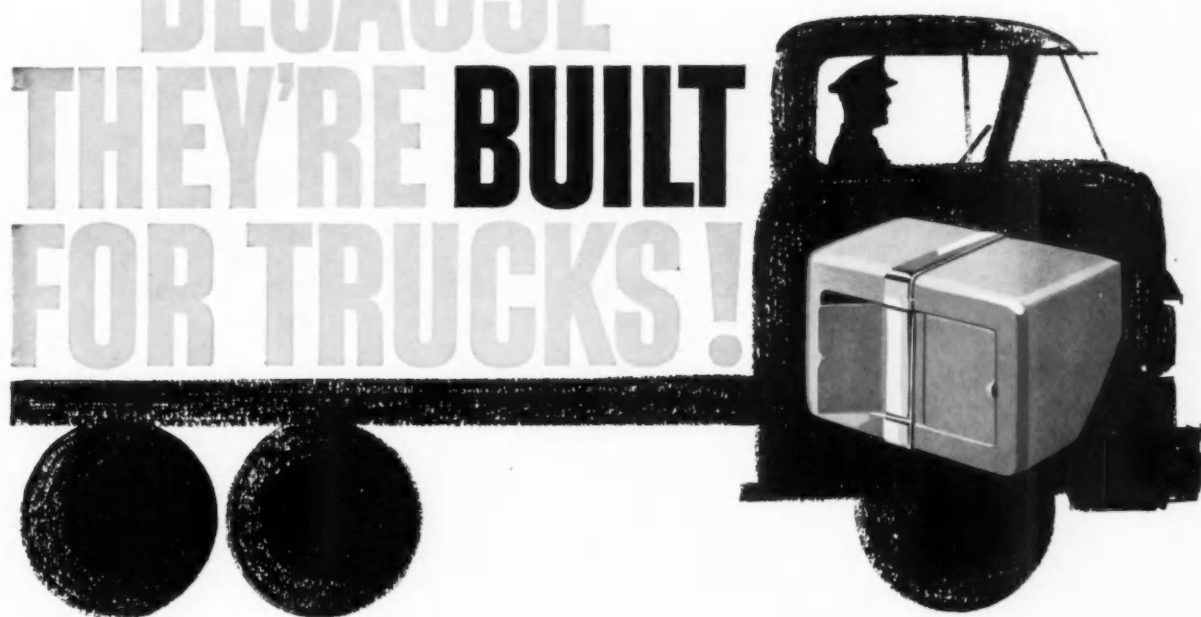
THE **MIRO-FLEX** CO., INC.

1824 E. SECOND  
WICHITA 14, KANSAS

M-160



# EVANS HEATERS ARE RIGHT FOR TRUCKS BECAUSE THEY'RE BUILT FOR TRUCKS!



There's as big a difference between truck and car heaters as there is between truck and car tires. The rugged construction of Evans truck-built heaters . . . the combination of the right BTU rating and *proper heat distribution* . . . just can't be matched by heaters built for cars. Whatever your truck heating requirements, our engineers are ready to work with yours to design an Evans heater to do the job. Write Evans Products Company, Dept. P-9, Plymouth, Mich.

**Regional Representatives:** Chicago, R. A. Lennox  
Detroit, Chas. F. Murray Sales Co.  
Allentown, Pa., P. R. Weidner

Circle 150 on Inquiry Card for more data

## EVANS

TRUCK AND BUS HEATERS  
AND VENTILATING SYSTEMS

EVANS PRODUCTS COMPANY  
Plymouth, Michigan



Circle 151 on Inquiry Card for more data →



## Much of the beauty of Chrysler cars

*The proper foundation of a Chrysler-style paint job shows itself in this gleaming Plymouth "body-in-white"—steel with the surface finish a truly fine car must have.*

Body parts for Chrysler cars emerge from a complex of huge presses and coils and sheets of flat rolled steel. Floor pans are formed, to be wed further on into single unitized assemblies of 50 major parts by fully-automated resistance welders. Doors are stamped with great precision, and 100 ton presses squeeze out car roofs, without a break or blemish.

This is Chrysler Corporation's Ohio Stamping Plant, giant of the auto industry, where 28 major stamping lines eat 2000 tons of steel a day and produce 600 different body parts. Steel is the basic raw material of this amazing plant—and the men who buy and use it know exactly what they need. As a regular supplier, J&L matches their needs *consistently*.



**Jones & Laughlin Steel Corporation**

3 GATEWAY CENTER, PITTSBURGH 30, PA.





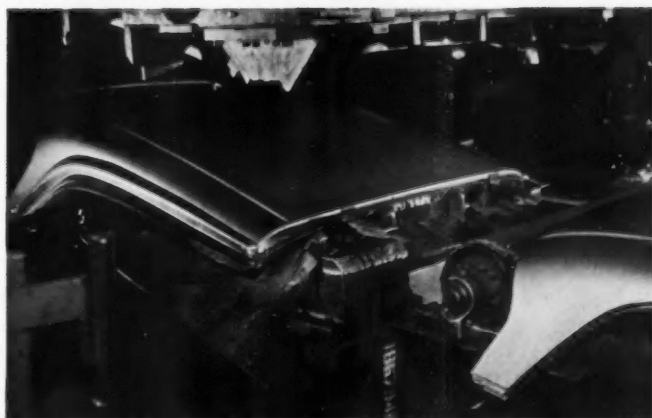
Feast your eyes on over 1000 lbs. of unadorned steel! Notice how the steel itself contributes to the elegance and grace of Chrysler styling—how, even in this raw metal stage, the "body-in-white" has a lustrous finish of real beauty.

## comes from the steel itself

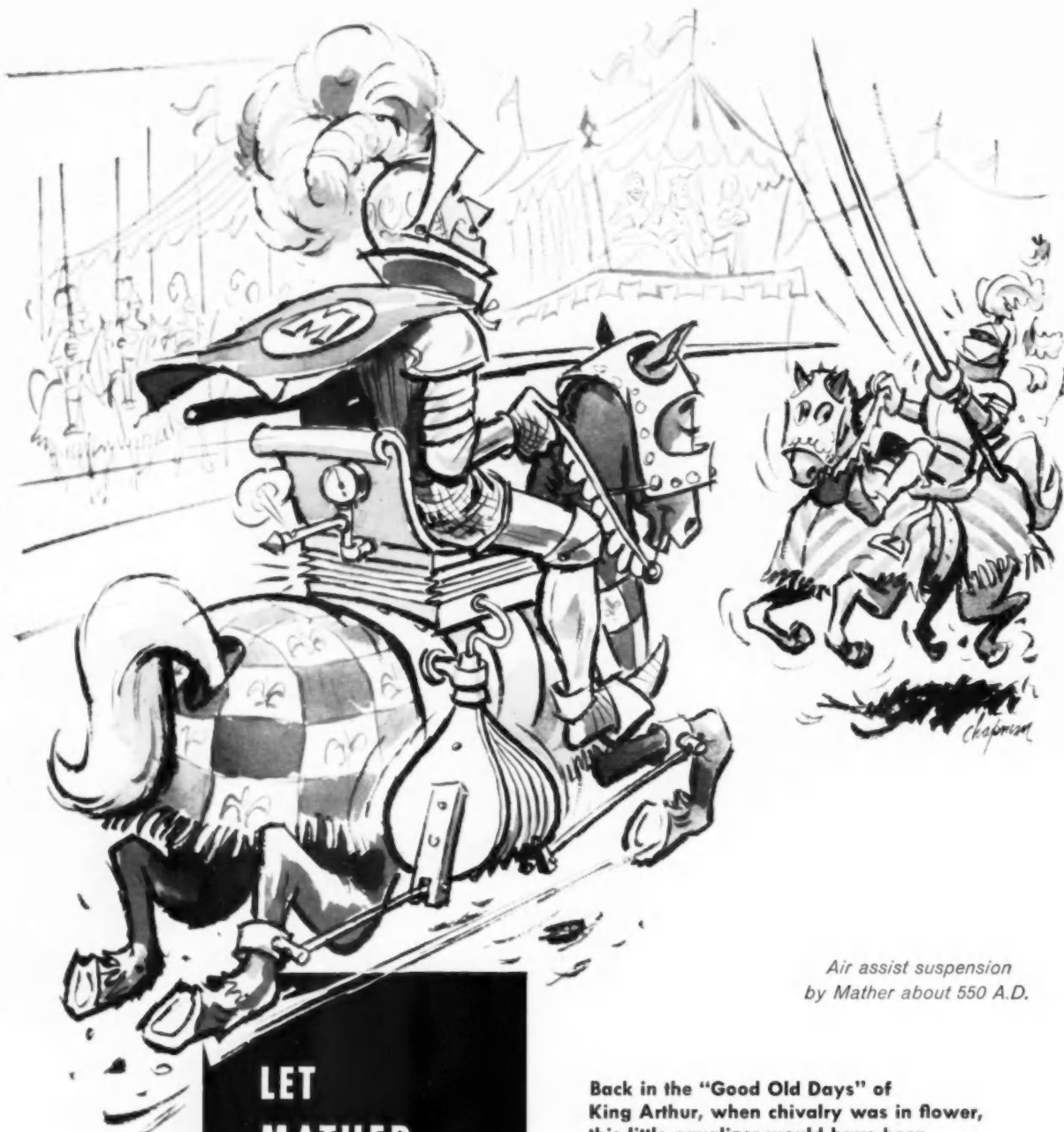
Each die-forming situation is individual and demands a specific set of metallurgical properties from the steel. In many cases, the factor of extreme importance is surface finish of the steel. Other times, drawing quality is paramount. And often, *combinations* of these and other qualities are needed, balanced one against the other with metallurgical precision.

The Ohio Stamping Plant may be big. But it is a tight operation—efficient, competitive, economical, with full control of quality at all times to insure the beauty and soundness of Chrysler bodies. That J&L steel is bought regularly, and used at one time or another in all the major parts produced by the Ohio Stamping Plant, speaks well indeed for J&L quality.

◀ This Steelmark identifies products made of steel. Look for it when you buy.



This is the roof line—at full rate of production. J&L is one of only three suppliers who can provide the 80-inch, 0.038-gage coils Chrysler needs here. Breaks and strain lines cannot be tolerated on roofs, so drawing quality is vital—as is surface finish, for reasons of appearance.



*Air assist suspension  
by Mather about 550 A.D.*

**LET  
MATHER  
SOLVE  
YOUR  
SUSPENSION  
PROBLEMS,  
TOO**

Back in the "Good Old Days" of King Arthur, when chivalry was in flower, this little equalizer would have been "joust about the last word".

Even though Mather engineers weren't available then, the entire Mather team . . . engineering, research, design and manufacturing has been available to suspension users for over 50 years; so if you need their help, please call CH 3-3201.

**MATHER**  
THE MATHER SPRING COMPANY  
TOLEDO, OHIO **M**



# New Trailers Carry Boats on Air Rollers

## Dana Corp. Launches Its First Consumer Product Line

WITH the development of boat trailers with air-inflated rubber rollers that can carry, interchangeably, both sailboats and power boats, Dana Corporation's Parish Pressed Steel Div. at Reading, Pa. has made its first entry into the consumer market.

The new trailers, named "Dana Hull-Gard," will be produced in four series totaling 32 models and sizes. They accommodate boats weighing up to 2400 lb, with centerline lengths up to 20 ft.

The nylon-reinforced-neoprene rollers, trademarked "Rollaires," are used as original equipment on the leading models. Each roller conforms to the boat hull geometry and forms a resilient support cushion on the order of 100 sq in. Protection of the hull against damage in transport is thus an outstanding feature of this design.

As many as eight rollers are employed per trailer. Inflated to 2 to 4 psi, the rollers are 12 in. long and have a 14-in. OD and a 4-in. ID. The rollers, in turn, are mounted on tubular steel members having a 4-in. OD and 19-in. length which are supported at each end in a self-lubricated molded nylon bearing. No bonding material is used between the roller and the metal tube, friction and air pressure being relied upon to hold them together. When a boat is being loaded or unloaded the roller assembly rotates on the nylon bearings.

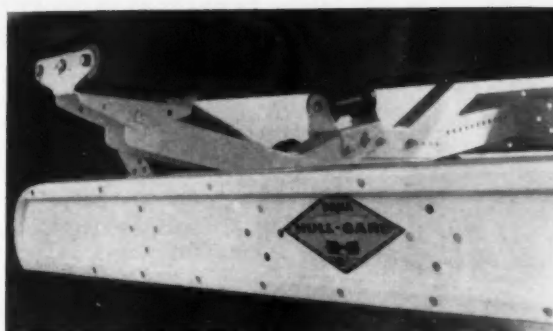
While the inflated rollers can be applied to most trailer models, solid rubber rollers are standard on lower-priced units. In this case, the solid rollers are 9 in. long, about twice conventional lengths. They are similarly placed to contact the boat hull along the full roller length, minimizing load concentration.

Used in combination with the 9-in.-long solid rubber rollers is a novel lever mechanism called "Adjust-O-Matic." With this "scissoring" arrangement the roller carrier arms pivot upward when the weight of the boat bears on the keel rollers, automatically positioning the outrigger support rollers against the hull. Removal of four bolts permits this ac-

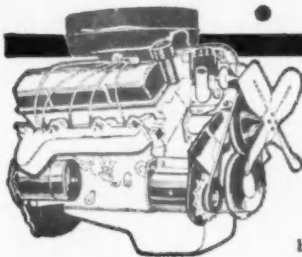
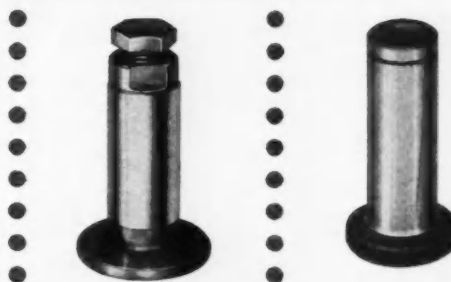
(Turn to page 112, please)

**Adjust - O - Matic mechanism on Premier model trailer distributes boat**

**weight between keel and outrigger solid-rubber rollers. The scissors arrangement automatically positions the rollers on the outriggers against the hull of the boat.**



## JOHNSON tappets



*\*for all engine applications*

All of the engineering and manufacturing effort at Johnson Products goes into producing a better tappet. Continual experimentation and exacting quality control make JOHNSON TAPPETS worthy of your consideration. Only proven materials, covering a range of hardenable iron, steel, and chilled iron of various alloys, are used in JOHNSON TAPPETS. These tappets are successfully used in jobs ranging from light duty to the most severe, punishing applications. Serving all industry that employs internal combustion and diesel engines.



*"tappets are our business"*

**JOHNSON  PRODUCTS**

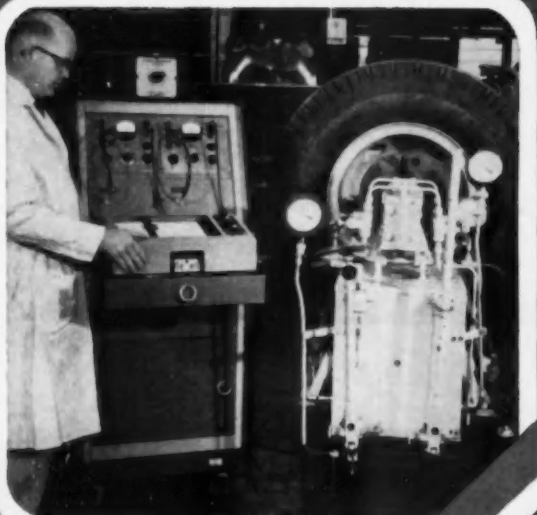
MUSKEGON, inc. MICHIGAN

# "With millions of lives at stake every year,



Mr. R. C. Hoffman, Jr., President, Carolina Coach Company speaking: "Our coaches travel 16 to 17 million miles per year, and carry millions of passengers. Our first thought is their safety; that's one reason we specify steel disc wheels as original equipment on all our buses."

Carolina Coach Company operates a fleet of 215 diesel buses in five Eastern and Southern States. The company has an excellent safety and low down-time record due to a thorough and extensive inspection and maintenance program. Every 20,000 miles each coach has a major inspection and every part is thoroughly examined. "At this time our steel disc wheels are carefully checked. Rarely do we have to discard one,"



# we specify steel disc wheels."

says Mr. Hoffman. "Some of our steel disc wheels have run 300,000 miles and they are still as good as new. Our safety program has practically eliminated road failures, and we think our steel wheels have helped here, too."

Steel wheels cost less in the beginning, and continue saving money for many thousands of miles of dependable service. They're round and true and eliminate lateral and radial run-out to make tires last longer. This gives a smoother ride, increases vehicle life, is easier on cargo, and cuts driver and passenger fatigue. Steel disc wheels are specially designed for today's high speed, long range operations. Always specify steel disc wheels.

*USS is a registered trademark*



This mark tells you a product is made of modern, dependable Steel.



## New Boat Trailers

(Continued from page 109)

tion. Replacement of the bolts in multi-hole brackets fixes the suspension in place to suit the hull configuration.

Trailer side frames are of Dana-Loy steel, 6 in. deep. CO<sub>2</sub>-protected welding is used in joining the various members. Bolt holes are provided at 10-in. intervals in the side rails so that the running gear and suspension assembly can be positioned un-

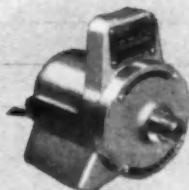
A quickly-attachable camper-cargo body, which is collapsible for storage or transport on the roof of an automobile, provides year-round use. When fitted with a canvas roof it makes a camper for outdoor sleeping. It has a cargo capacity of 500 lb.



*SPECIAL MOTOR PROBLEM?*

*A sharp pencil is all you need...*

*Got your special motor application problem down and send it to Lamb Electric...we'll do the thinking, design and manufacture. You get the right motor, "custom-tailored", and mass produced at the most favorable cost...*



Heavy duty industrial motor for portable concrete vibrator. Frame: 4" x 2 1/2".

PERSONALIZED  
MOTOR  
CONFERENCE



**Lamb Electric**

SPECIAL APPLICATION  
FRACTIONAL H.P. MOTORS

THE LAMB ELECTRIC COMPANY • KENT, OHIO

A Division of American Machine and Metals, Inc.

In Canada: Lamb Electric - Division of Sengano Company Ltd. - Leaside, Ontario

derneath the center of gravity of the boat being carried.

A second running gear assembly—making a total of four wheels and tires—can be added initially or later to most trailer models, for support of heavier boats.

Tires are 5.70/5.00 by 8 in. The tapered roller bearings in the wheel hubs have sealed-in lubrication, and are guaranteed for a year against deterioration in use including immersion in water. Brakes on the larger trailer models are self-contained in the trailer and hydraulically-actuated.

The suspension system employs stamped 4-in.-wide trailing arms and brackets, in combination with single coil springs each side. Two double-acting telescoping-type shock absorbers are included. Air springs (bottles) are available as an interchangeable option for the coil springs.

The trailer frame can be tilted to the rear while a boat is being loaded or launched. An easily-operated latch releases the lock which holds down the nose of the trailer frame.

The winch stand is curved upward and permits a boat to be snugged up against a bow chock or rubber keel roller that is mounted on the winch stand. The winch cable sheave is positioned on top of the stand to give the winch drum a straight pull against the boat regardless of its position.

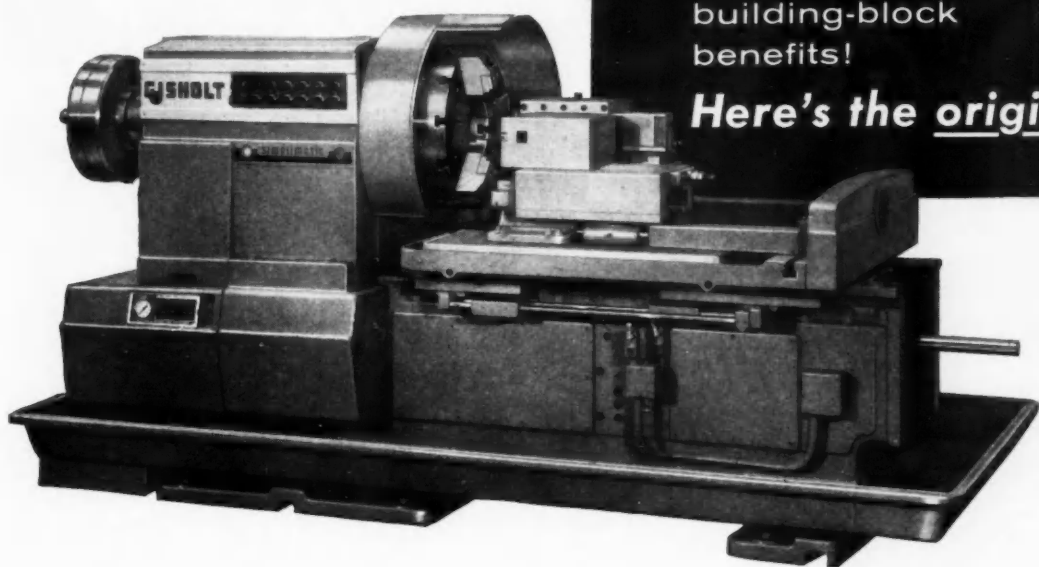
All electrical connections are water-tight and the wiring is plastic-enclosed. The combination tail-stop-turn lights are self-contained, hermetically-sealed units chosen for their water-tightness. In case of a burn-out, the complete lamp assembly is replaced somewhat like a sealed-beam headlamp.

Finish on the trailer frames is of baked-on white epoxy enamel—said to afford unusual resistance to salt water and the elements.

The trailer is also usable as a general-purpose all-season carrier, as well as a sleeper for two. A box-

(Turn to page 116, please)





Talk about  
building-block  
benefits!

Here's the original

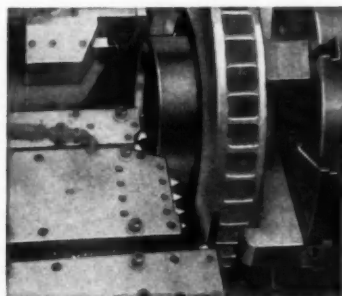
## *It does the work of special machines at standard machine cost*

Here in the Gisholt MASTERLINE Simplimatic Automatic Chucking Lathe is the essence of the building-block principle: a standard headstock and bed casting with a wide, flat platen table. To this you add the building blocks for most efficient tooling on each specific job. Standard front, center, rear or auxiliary slides with tool blocks may be positioned wherever they are needed to handle a maximum number of surfaces per chucking.

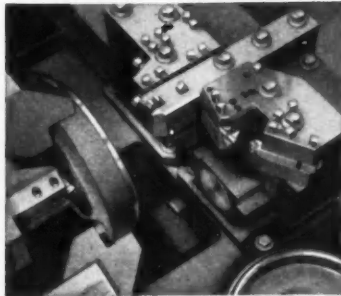
Between cycles, the platen table is well away from the spindle, providing easy access for loading and unloading. The table is screw-fed. This permits rapid advance to posi-

tion the tools right up to the work, or table-feed to bore, turn an O.D., or plunge facing tools to depth before slide movements begin. Each slide may feed at different rates, permitting an unlimited variety of cuts and tool approaches. Back boring and facing attachments permit machining front and back surfaces simultaneously, eliminating extra handling and equipment cost.

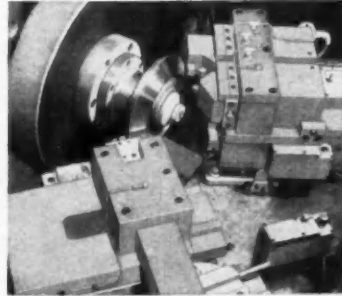
Three of the 39 jobs described in the Simplimatic Catalog are shown here. Write for Bulletin 1159-C or contact your Gisholt Representative to find out what the Simplimatic can do for you.



13.8 minutes! Cast iron rotor, 28" O.D., 6 1/2" wide. Table feed turns O.D., plunges facing tools to depth. Slides face flange, complete hub. Two-speed motor gives high speed for finish facing flange and chamfering.



2.4 minutes! Front and rear brake drums. Back facing attachment machines mounting face. Front slide turns and bores. Rear slide faces web and rim.



2.3 minutes! Steel bevel gear blank. Rear swivel-base slide tools straddle machine back angle, front co-bore and face as cam-controlled front slide tools face front angle.

• Turret Lathes • Automatic Lathes • Balancers  
Superfinishers • Threading Lathes • Factory Rebuilt  
Machines with New-Machine Guarantee

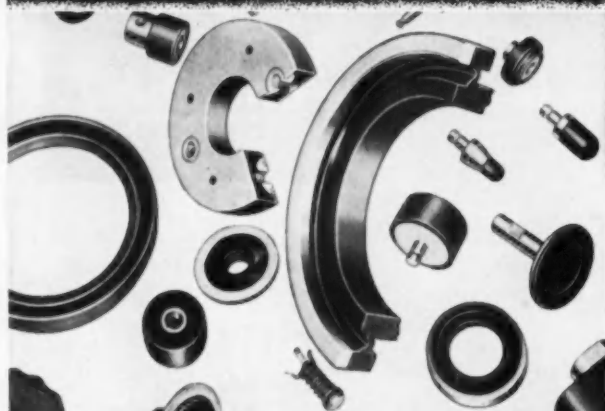


# **GISHOLT**

## **MACHINE COMPANY**

Madison 10, Wisconsin, U.S.A.

have a **BONDED to METAL** problem?



**FOR  
CUSTOM  
COMPOUNDED  
PRECISION  
FABRICATED**

**Go Goshen RUBBER**

**BONDED  
TO  
METAL  
PRODUCTS**

The unique GORBOND process developed by Goshen Rubber permits parts fabricated from natural, synthetic and silicone rubbers, to be bonded to metal, plastics and most anything . . . to meet customer satisfaction. Facilities are complete and modern, for efficiently handling large and small quantities.



On your very next bonding problem, call in the specialist from Goshen.

**Goshen Rubber Co., Inc.**

2790 S. TENTH STREET

GOSHEN, INDIANA

## **Manufacturers' News**

### **Bendix Acquires Firm**

The Bendix Corp. has acquired a controlling interest in Diseñadores y Constructores, S.A. (Dicos), one of Mexico's leading tool and die firms. Automotive brake equipment, carburetors and other components will be added to the Dicos product line. The company's name has been changed to Bendix de Mexico, S.A. Dicos officers who will continue in their present posts are Alfonso Galan, president, and Ricardo Beltran, executive vice president.

### **Clark Development Division**

Clark Equipment Co. has established a new division with responsibility for exploring and evaluating areas for possible expansion. Called the Clark Development Div., the group will emphasize research in areas where Clark is not now active and will investigate possibilities for expansion of existing lines. Three top officials of the new division are Cyril B. Rogers, manager; Glen Johnson, marketing manager, and Richard Jung, chief engineer.

### **Engineering Standards Glossary**

A glossary of terms for use by English-speaking countries, with reference to screws, has been brought closer to reality as the result of decisions reached at the recently concluded ABC (American, British, Canadian) Conference on Unification of Engineering Standards in Ottawa, Canada.

At the meeting, Roy Trowbridge, General Motors Corp., was leader of the U. S. delegation. Sir Anthony Bowlby of Guest, Keen and Nettlefords led the British group and J. G. Morrow, past president of the American Iron & Steel Institute, led the Canadians.

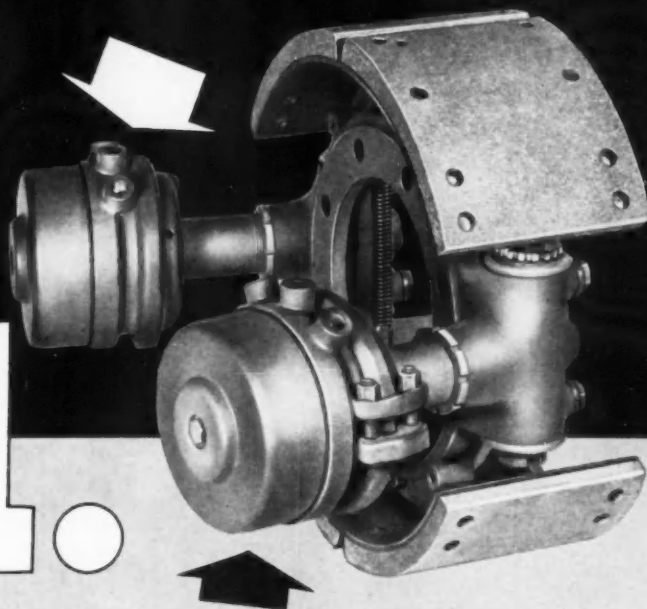


Adjustable storage racks shown in Detroit factory of Long Mfg. Div. of Borg-Warner Corp. assure nearly 200 per cent increase cu ft storage in same area. The Speedrack was installed by Huntoon Equipment Co., Detroit.

# *NEW* **STOPMASTER BRAKE**

**OFFERS THESE 3 BIG EXTRAS!**

*ANOTHER  
ROCKWELL-STANDARD  
FIRST!*



**Proven the most advanced  
brake design in 30 years . . .**

Outstanding improvements, such as a new balanced shoe actuation principle and 15" diameter, have made the Stopmaster Brake the industry's most efficient and dependable brake. Now Rockwell-Standard also offers you these three important extras in the Stopmaster:

**"Fail-Safe" Units . . . now available  
for air actuated Stopmaster Brakes.**

- Prevents runaway vehicles due to loss of air, when in operation or parked.
- Positive mechanical operation . . . can be installed to operate from dash control valve or automatically, or both ways if desired.

• Lightweight and compact . . . no installation problems, no cables or special brackets required.

• Provides mechanical parking brake . . . eliminates need for prop-shaft brake.

• Brakes easily released . . . without air pressure.

**2 Automatic Brake Adjustment . . . available on  
all Stopmaster Brake sizes for trucks, trailers, and  
off-highway vehicles.**

- Eliminates periodic manual adjustment.
- Cuts expensive maintenance costs.
- Brake maintains proper adjustment during entire lining life.
- Safer operation at all times.

**3 Lubrication Eliminated.** All actuating parts are sealed in lubricant. Standard on all models.

- Prevents oil-soaked linings due to over lubricating.
- Moving parts last longer.
- Reduces friction.
- Completely sealed unit reduces effect of elements.

*Another Product of...*

**ROCKWELL-STANDARD**  
CORPORATION



Brake Division, Ashtabula, Ohio

## New Boat Trailers

(Continued from page 112)

type camper-cargo body is available which is quickly attachable by snap fasteners to all trailer models.

The sheet-steel body measures 4 by 6½ ft by 18 in. high, and weighs about 50 lb. It can transport about 500 lb of cargo. The body folds flat for storage, and can be carried on the roof of an automobile. Stake sides may be attached to increase its volume. A canvas roof for the body is also obtainable.

These trailers are the first consumer product line of the Dana Corp., a major supplier of automotive parts and components for more than 50 years. "We believe the Hull-Gard trailers will set a new quality standard in the boat trailer field," says John E. Martin, Dana president. "Behind them is nearly three years of research and engineering, including surveys of what boat owners, makers and dealers believe a boat trailer should be. We made use of their suggestions."

Dana's Parish Pressed Steel Div. plant in Reading is equipped to pro-

duce the new trailers in "virtually unlimited numbers," according to Harlan B. Bartlett, Parish general manager. The trailers will be made on what he described as "the marine industry's most modern mass production line."

## Dana's New Laboratory

(Continued from page 104)

tioned test cells are provided for testing such Dana products as clutches, propeller shafts, transmissions, and power take-offs. A chassis dynamometer, used for test runs on either trucks or passenger cars, is located in one test chamber.

Other equipment available in the cells includes dynamometer drive units up to 150 hp; eddy current absorption units up to 1000 hp; 4-Square load life testers up to 6500 lb ft; a 240,000 lb in. Olsen torsion tester; cycle fatigue testers up to 80,000 lb in.; and a 200,000 lb ft Olsen tension-compressor.


Test cells are equipped with individual thermostats, and air circulating and exhaust systems. Not only were they constructed to maintain the lowest possible noise level, but also to completely separate noisy, dirty, and dangerous tests. Laboratory offices, centrally located in the area, also are sound-proofed.

The corporate Metallurgical Laboratory is located at one end of the Experimental Laboratory. Its mission is to establish metallurgical processes for all of the company's manufacturing divisions, acting both as a guide and consultant to them. Its work includes new heat treat developments, testing, creating, and adapting new materials, and pure metallurgical and chemical research. It is equipped with some of the latest available metallurgical test devices.

In addition to all of this internal equipment, Dana also is equipped to conduct extensive road tests, many of them under turnpike driving conditions.

For this, such vehicles as heavy-duty Diesel trucks, heavy-duty gasoline-powered truck tractors, heavy-duty trailers capable of carrying complete test cells and a variety of passenger cars are available, as is full instrumentation for testing on the road.

FOR DEPENDABLE *All Weather* COOLING



Install  
**EUREKA**  
RADIATORS

Over 30 years of specialization and engineering research have produced a radiator and core proved dependable under all conditions.

*We Invite*  
**INQUIRIES**  
**ON**  
*Complete Radiators*  
**FOR ALL**  
**INDUSTRIAL**  
**APPLICATIONS**

- **ALL-COPPER CORES and TUBES**  
double-lock seamed give greater strength and eliminate danger of rusting
- 1-piece upper-and-lower-tank brass stampings for **POSITIVE PROTECTION FROM LEAKAGE AND VIBRATION . . .**
- Large tube area for **EFFICIENT COOLING IN ALL WEATHER**, all driving conditions . . .
- **GUARANTEED**  
against defects in materials and workmanship.



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**AUTO RADIATOR Manufacturing Co.**

2901-17 INDIANA AVE.

CHICAGO 16, ILLINOIS



**control  
small engine  
vibration**

MAXIMUM SPACING FOR  
MAXIMUM STABILITY

LORD P/N J-4624-17  
2 REQ'D

*and give your product these competitive advantages:*

- SMOOTH OPERATION**  
 Isolate vibration and you get a product that runs smoother, operates easier, lasts longer. Fasteners stay tight, controls maintain adjustment.
- LESS NOISE**  
 Lord mountings damp structure-borne noise. Result: no vibrating hoods, panels or housings to create an irritating racket.
- GREATER SALES APPEAL**  
 Everyone prefers equipment that is quiet, reliable, comfortable to ride or use — equipment protected against fatigue failure and premature wear.

SNUBBING WASHER  
LORD P/N J-7733-1  
2 REQ'D  
APPROX 45°

MAXIMUM SPACING FOR  
MAXIMUM STABILITY

You can assure  
all these with  
**Lord vibration/shock/noise control!**

FRONT

Wherever you use small engines—in mowers, scooters, golf carts, garden tractors, utility vehicles—you can give your product a real performance lift with a Lord flexible suspension.

How much improvement can you expect? One example: Think of the outstanding success in noise reduction achieved by the outboard motor manufacturers. Today, nearly all outboards include Lord suspensions.

Lord can design a mounting system engineered to your engine configuration and drive. High isolation efficiency and good stability can be achieved even in belt-driven systems. And the cost will prove attractive.

Why not use Lord's unmatched capabilities in vibration/shock/noise control to upgrade your competitive position. Contact the nearest Field Engineering Office or the Home Office, Erie, Pennsylvania.

AUTOMOTIVE INDUSTRIES, September 15, 1960



#### FIELD ENGINEERING OFFICES

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 BOSTON, MASS. - Hancock 6-9135  
 CHICAGO, ILL. - Michigan 2-6010  
 DALLAS, TEXAS - Riverside 1-3392  
 DAYTON, OHIO - Baldwin 4-0351  
 DETROIT, MICH. - Diamond 1-4340  
 KANSAS CITY, MO. - Westport 1-0138

LOS ANGELES, CAL. - Hollywood 4-7593  
 NEW YORK, N.Y. (Paramus, N.J.)  
 New York City - Bryant 9-8042  
 Paramus, N.J. - Diamond 3-5333  
 PHILADELPHIA, PA. - Pennypecker 5-3559  
 SAN FRANCISCO, CAL. - EXbrook 7-6280  
 WINTER PARK, FLA. - Midway 7-5501

"In Canada — Railway & Power Engineering Corporation Limited"

**LORD MANUFACTURING COMPANY • ERIE, PA.**

Circle 158 on Inquiry Card for more data

# DO YOU USE HOSE CLAMPS BY THE CARLOAD?



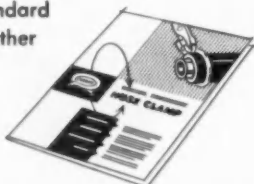
## You can count on CORBIN!

Your hose clamp needs are in safe hands at Corbin! Production is geared to meet volume requirements. And ample stocks are kept in reserve for quantity shipments on any standard size within 24 hours in emergencies. For *dependable* hose clamp supply — by the carton or the car load — count on Corbin . . . makers of the original self-tightening hose clamp . . . the world's leading hose clamp supplier!

## you get all this from CORBIN...

- ✓ **PROVEN PERFORMANCE** — Used by many leading manufacturers since first introduced
- ✓ **VOLUME SUPPLY** — Corbin is the world's leading hose clamp supplier — the safe source for volume users
- ✓ **SCHEDULED DELIVERIES** — Shipments systematically geared to your production schedule
- ✓ **RESERVE STOCKS** — Emergency needs are promptly met from continuously maintained reserves
- ✓ **ALL SIZES** — More standard maker sizes than any other

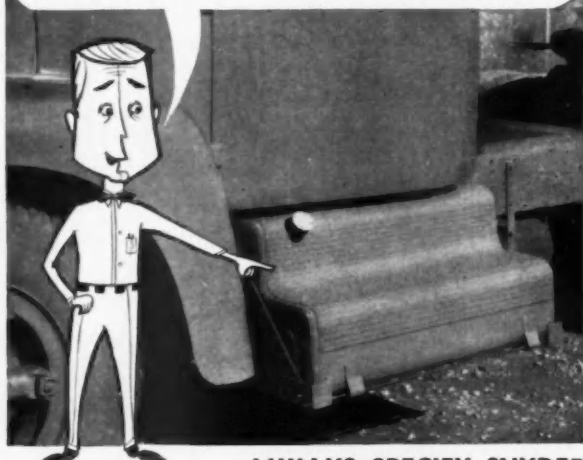
Write for Fact Folder HC20  
and Size Specification Sheet



**CORBIN HOSE CLAMP DIVISION**  
THE AMERICAN HARDWARE CORPORATION  
NEW BRITAIN, CONNECTICUT

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# LET OUR QUALIFIED SALES ENGINEERS HELP YOU SOLVE YOUR FUEL TANK PROBLEMS.



ALWAYS SPECIFY SNYDER

## Snyder Tank CORPORATION

P.O. BOX 14, BUFFALO 5, NEW YORK

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## SYNFLEX Self-Storing Air Hose

STORES IN 1/30TH  
IT'S WORKING LENGTH

With a working length of up to 23 feet, Synflex Self-Storing Air Hose retracts automatically into a storage coil only 9 inches long — neat and compact for space saving and SAFETY.

Made from a special Nylon formulation, Synflex is lighter and less bulky than rubber hose. Ideal for air-driven equipment — portable or fixed installations. It is kink and abrasion-resistant and impervious to oils and greases. Micro-finished bore and full-flow, reusable fittings assure unobstructed air flow to 200 psi.

Available with 1/4" I.D. (S8) and 3/8" I.D. (S12). Brown-orange color gives high visibility — for safety. Full details on request.

A-2702A

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**SYNFLEX**  
Products Division  
Samuel Moore & Co.  
Mantua, Ohio

9"  
23'  
WORKING LENGTH

Circle 161 on Inquiry Card for more data

## Mechanized Molding System at Deere Tractor Works

(Continued from page 74)

temperature of the six cope and six drag patterns at 450F. The gas-air combustion mixture is piped to the burners through a 12-outlet compound swing joint at the center of the index table.

Emerging from the tunnel oven at the loader station, a contoured flask is picked up by the transfer cylinder and pushed into the loader carriage where it is latched. The loader carriage descends and places the flask on the pattern alignment pins, the latches release, and the carriage travels back up to its normal position ready to receive the next flask.

Three indexes of the rotary table locate the flask and pattern under the blow head where they are elevated by a hydraulic cylinder and clamped firmly against the face of a water cooled, universal blow plate. The resin-sand mix is blown in between the contoured flask and the pattern, the maga-

zine exhausted, and the flask and pattern again lowered to their position on the index table. Blow pressures may vary from a low of 30 psi to a maximum of 70 psi. The blow time is approximately 3 seconds. Venting of the blow air is done at the parting line between the flask and the pattern.

Six more indexes of curing of the resin-sand liner bring the flask directly under the stripping station. The burner box is clamped solid and the stripper carriage descends so that the arms and rails may grasp the side flanges on the flask. As the carriage ascends, the flask is stripped vertically off the pattern and travels upward to the transfer height where a transfer cylinder pushes it out of the stripped carriage into a combination rollover, turn, and lowering unit. A transfer cylinder pushes the flask out of the lowering unit onto a gravity conveyor where the

shell cores are set either in the cope or drag flask prior to closing and wedging ready for pour-off. With the overall system loaded with eight contoured flasks for each of six different jobs, there are 96 flasks traveling around the closed loop conveyor system at the rate of 90 molds an hour. Under these conditions the rotary molding machine is fully loaded and the loading, blowing and stripping occur simultaneously between index movements of the table.

The system is making flywheel castings, transmission cases for crawler tractors, and loader counterweights. Each casting requires cope and drag patterns, and cope and drag backup flasks. Almost any piece that falls within the platen size of the machine, and does not require complicated parting line location could be cast on the equipment. ■

**AUTOMOTIVE INDUSTRIES  
KEEPS YOU INFORMED**

### Quantity PRODUCTION of GREY IRON CASTINGS

ONE OF THE NATION'S  
LARGEST AND MOST MODERN  
PRODUCTION FOUNDRIES

ESTABLISHED 1866

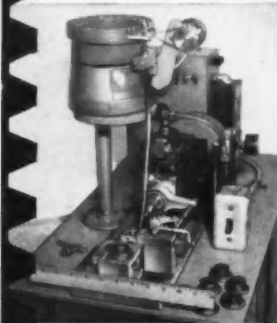
**THE WHELAND COMPANY**  
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS  
CHATTANOOGA 2, TENNESSEE

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### new hopper feeder QUADRUPLES SET SCREW INSERTION RATES

**Labor costs cut by 75%**



Changeover from manual to automatic insertion of set screws is now easier and more profitable than ever. More profitable because this new, compact, Setko Hopper Feeder requires less space—and embodies advancements and refinements in design to make for greater operating efficiencies. It is now possible to actually quadruple insertion rates over the hand method, while cutting labor costs in half.

Additional savings result from a reduction in rejects and floor loss. Users report "rejects have been cut to almost zero and floor loss has been eliminated!"

**Feeds any type of set screw with any point.**

Hex Socket, Fluted Socket, Slotted or Slabbed heads can all be oriented and fed with equal efficiency.



**SEND TODAY FOR FULL INFORMATION**

Send for recommendations and quotations. Ask for Catalog 23 showing the full line of Setko Socket Screw Products.



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## NEW PRODUCTS

(Continued from page 91)

### Curved Preforms

A new concept in preform designs for tubular brazing applications has been created. Curved washers and shims are now being custom manufactured of silver alloys to meet individual requirements. Applications on which one tube is radiused or saddled to fit over another are sometimes difficult to preform with a washer or shim. The stiffness of the washer may hold the radiused member away from the other tubes. By curving the washer to the curvature of the tube, the problem is minimized. *Lucas Milhaupt Engineering Co.*

Circle 85 on postcard for more data

### Low Temperature Start

A "manifold air heater" developed by *Scintilla division of The Bendix Corp.* in cooperation with *Continental Aviation and Engineering Corp.* and the *Ordnance Department* is

being used as a cold-starting aid on the *Continental AVDS-1790-2* engine that powers the Army's *M-60* tank. The Bendix system, which is said to offer the advantages of efficient operation coupled with design simplicity and minimum supply problems, will permit extremely rapid diesel engine starts at temperatures of  $-40$  deg F or lower, according to the report. The system operates by injecting engine fuel into a combustion chamber mounted on the engine intake manifold in which it is mixed with air and ignited by an ignition unit. The heat from the combustion in the intake manifold brings the temperature of the air up to the proper level for efficient engine compression. The following units form the heater system: ignition unit; heater unit, which mounts on the intake manifold; spark plug lead, which connects the ignition unit and spark plug located in the heater unit; and a solenoid valve that controls the flow of engine fuel to the heater unit. A system for an engine consists of two sets of each of the components—a set mounted on each side of the "Vee" engine. *The Bendix Corp.*

Circle 86 on postcard for more data



## Here's why AIRETOOL muffled motor grinders boost production...

Available on Airetool Vertical Grinders 600-V and 700-V, the new muffled motor cuts nerve-shattering exhaust noise to a minimum. Operator fatigue is reduced. Grinding efficiency and production go up as the noise level comes down. Muffled motors prove especially effective for assembly line use where hundreds of tools contribute to the general noise.

Test a muffled motor grinder in your plant; Airetool will be glad to demonstrate its effectiveness without obligation. For information on Airetool's full line of pneumatic grinders and production tools, write for Bulletin 70 today.



More than 30 years' experience in pneumatic tools

Branch Offices: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge  
Representatives in principal cities of U.S.A., Canada, Mexico, South America, Puerto Rico, England, Europe, Italy, Japan, Hawaii  
Canadian Plant: Brantford, Ontario  
European Plant: Vlaardingen, The Netherlands  
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## NEW FOAM PLANT



Here are the advantages you can expect when you specify MIDWEST FOAM—

- ALL TYPES OF Polyether or Polyester FOAMS
- Quality with economy
- Customized service
- Controlled cellular structure
- Uniform propriety and compression
- COMPLETE DESIGN SERVICE AVAILABLE

Representatives—we still have some choice territories available. If you would like to represent the finest plastic foam producer in the United States, contact us immediately.

Here are the finest facilities available anywhere with the newest techniques in the production of polyurethane foam. A 600' production line customized to your specifications is at your command. We can guarantee your needs on your delivery date to eliminate your storage costs and to eliminate costly rejects and obsolesces. We have the automation, you push the button.

NO ORDER TOO SMALL OR TOO LARGE

## MIDWEST FOAM PRODUCTS COMPANY

1632 Chicago Avenue, Evanston, Illinois, Phone DAVIS 8-6905. Factory: North Chicago, Illinois

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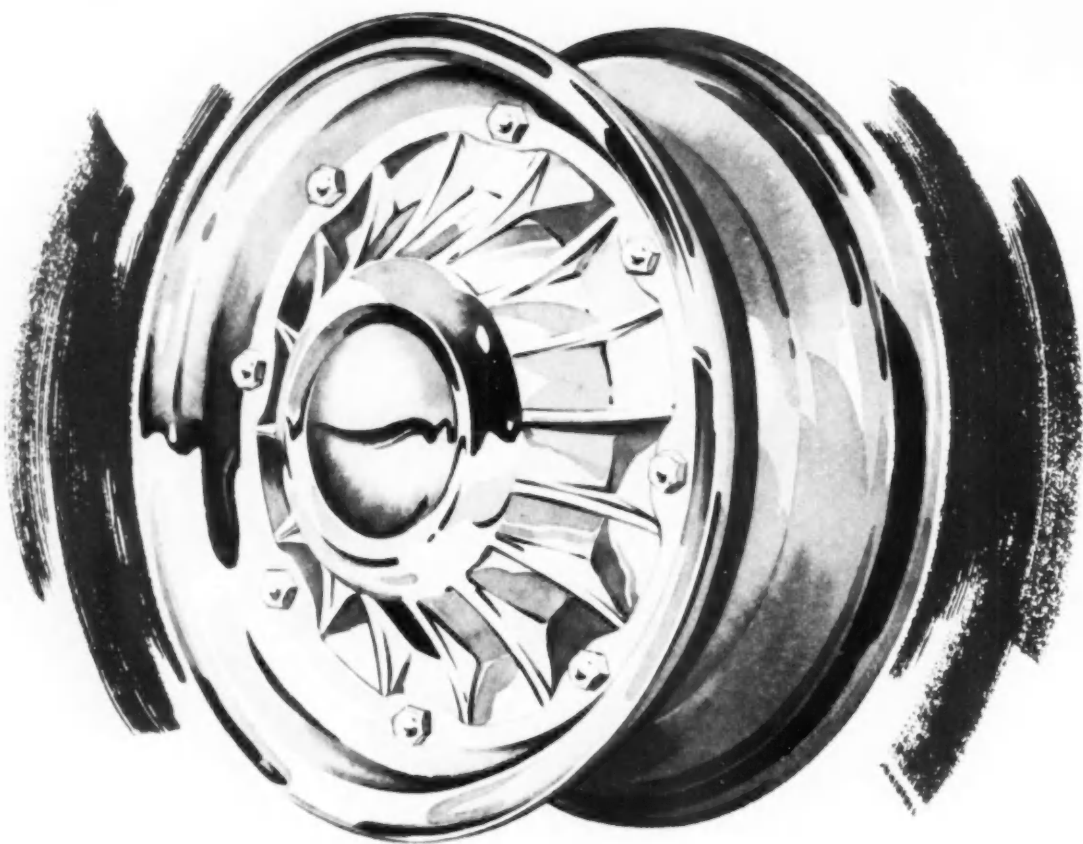


## Aluminum Wheels



improve performance,  
permit design versatility,  
reduce costs...

Circle 10 on Reader Service



## Aluminum Wheels

with integral wheel, brake drum and hub, offer important benefits to both automobile owners and manufacturers. The most important *performance advantages* to the car owner are these: (1) Aluminum's superior ability to dissipate heat—as proven in aluminum brake drums—reduces brake fade, improves brake recovery, and lengthens brake lining and drum life. (2) Lighter aluminum wheels permit reduction of unsprung weight and better ride characteristics. (3) The integral construction of aluminum wheels permits more uniform braking and reduces tire wear.

Integral aluminum wheels also offer *manufacturing advantages* in the areas of production economies and increased styling design freedom. They permit production savings through reduction of number of components per wheel, reduced inventory and lower tooling costs. New process developments, now being considered for future integral aluminum wheels, promise additional gains. Closer tolerances, reduced

machining, practicability for automation, and improved mechanical properties and reliability are seen as important dividends. From a styling standpoint, integral aluminum wheels permit countless interesting design variations. And the possibility of a variety of colorful finishes on aluminum wheels is another bright thought for stylists to consider.

Reynolds Aluminum Specialists are available to work with you on a wide variety of aluminum applications. Write or phone *Reynolds Metals Company*, P.O. Box 5050, Seven Oaks Station, Detroit 35, KENWOOD 7-5000. Or contact your nearest Reynolds office or write P.O. Box 2346-MY, Richmond 18, Virginia.

**NOTE:** Before you buy any part—have it designed and priced in aluminum. Basic material costs do not determine part costs. New techniques and processes—applicable only to aluminum—can give you a better product at a lower final cost.



## REYNOLDS ALUMINUM

the metal for *automation*

Watch Reynolds new TV show "Harrigan & Son", Fridays, starting October 7; also, "All Star Golf", Saturdays, resuming October 15—ABC-TV. And on Sunday, October 16, be sure to see the exclusive showing of America's new 1961 cars on The National Automobile Show, direct from Detroit over CBS-TV, 6 to 7 P.M. E.D.S.T.

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# YOURS FOR THE ASKING ...

## the ALL-NEW AUTOMOTIVE INDUSTRIES EDITORIAL INDEX (Vol. 122)

covering the issues from January 1 to June 15, 1960, inclusive

Your copy of the newly revised Editorial Index is now available. This handy index saves valuable time in searching for specific subjects covered in the past issues of AUTOMOTIVE INDUSTRIES, and is made available to you as an additional service.

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The new Index quickly summarizes all the editorial articles alphabetically by subject along with page numbers and date of issues in which they appear. Articles are listed under several major classifications with considerable cross-indexing for quick reference.

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▶ Please send me, without charge, the new AUTOMOTIVE INDUSTRIES Editorial Index covering the 12 issues from January 1 to June 15, 1960, inclusive (Volume 122).

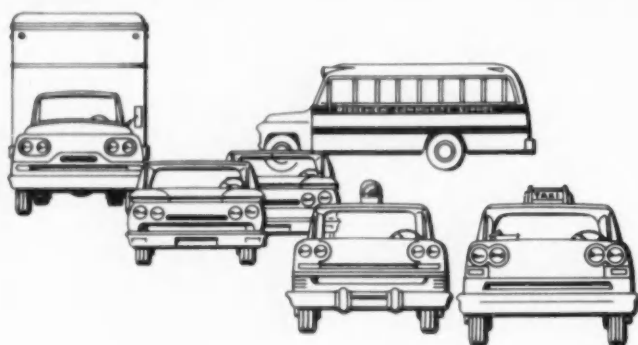
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▶ Company .....

▶ Company Address .....

▶ City ..... State .....



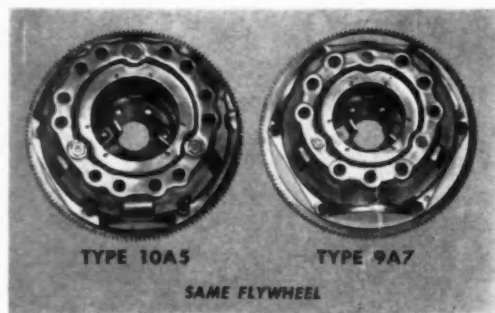
# New Interchangeable **BORG & BECK** Clutches for Fleets, Police Cars, Taxis

**More Capacity—no increase in  
bolt circle or flywheel size**

Now there's no need to change the bell housing, flywheel, motor mounts or pedal linkage when converting cars for fleet, police, taxicab or other heavy duty service. Borg & Beck's new A5 clutches are designed specifically for these installations, as well as for trucks and school buses—provide the additional capacity required, yet are interchangeable with the next smaller size of Borg & Beck Types A7, A8 or A9 clutches.

Type 10A5, for example, mounts on the same flywheel bolt circle as Type 9A7—yet is rated at 265 ft.-lbs. torque capacity compared with 210 ft.-lbs. for the 9A7.

Like all Borg & Beck clutches, the new Type A5 clutches are designed, engineered and built to Borg & Beck's leadership standards for quality, performance and value. That's your assurance of complete satisfaction. Consult our engineers for full details.



**BW**  
**BORG-WARNER**

# **BORG & BECK®**

THE AUTOMOTIVE STANDARD FOR MORE THAN 40 YEARS  
BORG & BECK DIVISION, BORG-WARNER CORPORATION, CHICAGO 38, ILLINOIS  
Export Sales: Borg-Warner International, 36 S. Wabash, Chicago 3

Circle 167 on Inquiry Card for more data



# CHRYSLER ENGINES

**keep on  
working  
after other  
engines  
have quit!**

**PROOF:** Jarvis R. Zeeck farms 1,000 acres in West Texas with eight irrigation wells. He says, "The other engines I tried had a bad habit of breaking down when I needed water the most. But my Chryslers set up and run all season without trouble. They just don't wear under the strain like other engines. Last year we irrigated before planting in April and May, then ran the engines continuously—24 hours a day, 7 days a week—from June 15th 'til October 1st. We didn't lose a single day—or even an hour—because of engine trouble."

## CHRYSLER



MARINE AND INDUSTRIAL ENGINE DIVISION  
CHRYSLER CORPORATION • DETROIT 31, MICHIGAN

AUTOMOTIVE INDUSTRIES, September 15, 1960

Take the toughest industrial applications you can find. Applications that demand all-out power—day after day after day. That's where you'll find Chrysler power preferred.

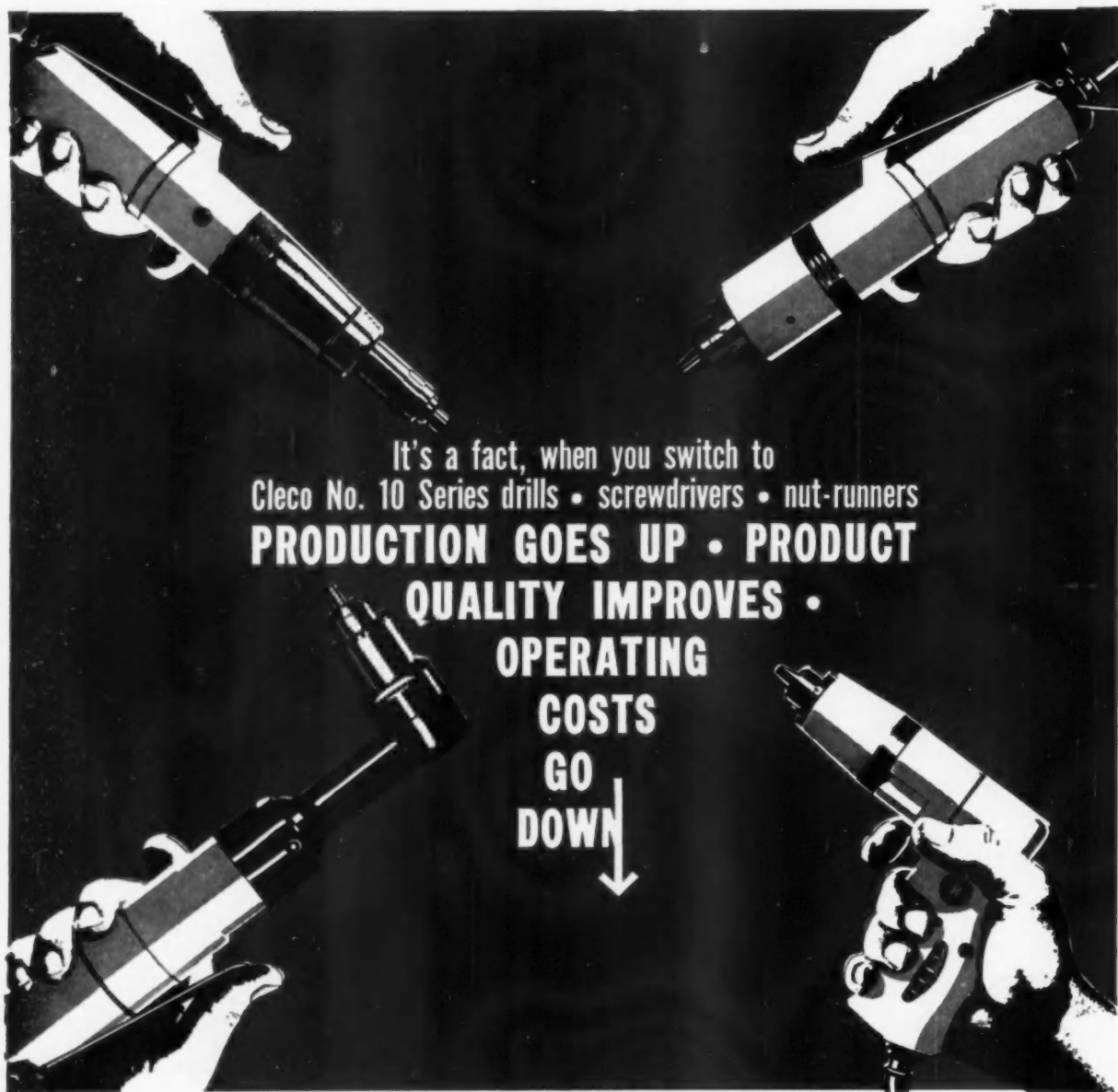
Irrigation is a good example. Irrigation engines work at full throttle, full load—24 hours a day for months at a time. It doesn't take long to separate the workhorses from the ponies.

Check the record and you'll find that Chrysler outsells all other irrigation engines in its power range. Why? Because Chrysler engines keep on working after the others have quit.

What's your application? Chances are there's a rugged Chrysler engine in the 170 to 413 cu. inch range that's just right for your job. Ask us.



Circle 173 on Inquiry Card for more data



It's a fact, when you switch to  
Cleco No. 10 Series drills • screwdrivers • nut-runners  
**PRODUCTION GOES UP • PRODUCT  
QUALITY IMPROVES •  
OPERATING  
COSTS  
GO  
DOWN** ↓

**Here's why:**

**Reduce parts inventory.** By using identical parts throughout the series (where feasible), and by designing the tools with built-in interchangeability features, Cleco has made it possible for you to *simplify and reduce parts inventory.*

**Cost less to operate.** No. 10 Series motors are more powerful, yet actually require less air per h.p. output. Well-balanced, and easy-to-handle, these tools are constructed of heavy duty material (high quality Ni, Cr, Mo alloy steel pinion and planet gears, for example) that can really take the demolishing punishment of high production operations. Friction-free clutch permits longer, *much longer* periods of maintenance-free operation.

**Speed production,** while improving quality con-

trol. No. 10 Series Drills and Screwdriver — Nut-Runners have design features that reduce time lost and rejects. *No. 10 Drills:* are equipped with 3-idler planetary gear trains for all gear reductions; have a low noise level; and develop 1/3 h.p. Drill speeds range from 500 to 20,000 r.p.m. *No. 10 Screwdriver — Nut-Runners* are available in speeds from 500 to 5,000 r.p.m. Equipped with a no-drift locking device, No. 10 Screwdrivers have unequalled torque holding ability. They cannot over-torque, strip threads, crack plastic, or damage screw heads.

You will not believe that these tools could possibly have so many positive advantages until you see them for yourself, so contact your local Cleco® representative for a no-obligation demonstration. For specifications and literature, write:



A DIVISION OF REED ROLLER BIT COMPANY  
P. O. BOX 2119 • HOUSTON 1, TEXAS, U.S.A.

IN CANADA: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Leaside (Toronto), Ontario

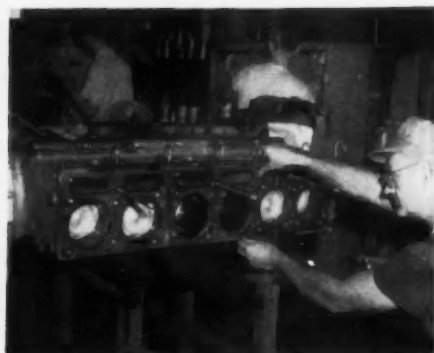
# Longer Life for Engines



## Grommets of Silastic Withstand 350F; Effectively Seal Coolants

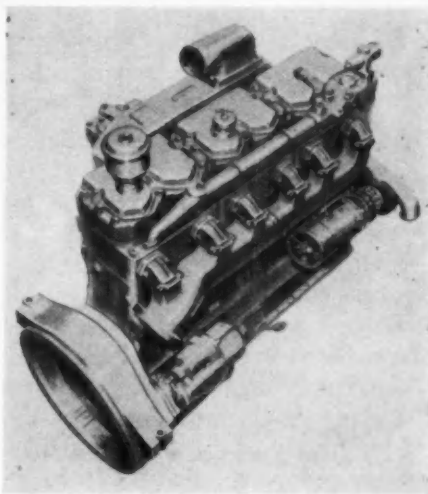
To keep today's high powered construction equipment and on-highway trucks operating efficiently requires engines that are really rugged! And ruggedness is what Cummins Engine Company has built into their line of diesel engines. These engines are *guaranteed for 100,000 miles or 3,600 hours!*

A factor in the performance of their engines is a set of 24 cylinder-head grommets made of Silastic®, the Dow Corning silicone rubber. The grommets proved so effective in Cummins' new engines, they are now specified as standard components on other models throughout the Cummins line. These resilient silicone rubber rings are positioned over the entrances to coolant passages in the top of the block. They prevent leakage of coolant and antifreeze into the engine and the costly damage that could result. The grommets snap into the cylinder head gasket where they remain flexible and sure-sealing, despite attack by cooling fluids and engine temperatures in the 300 to 350 F range.



Oil seals, diaphragms, and many other automotive parts are fabricated of long-lasting Silastic, too. Original physical properties are essentially retained in temperatures from -130 to 500 F; resist oxidation, weathering, moisture and compression set. Silastic stays rubbery under the most adverse operating conditions — provides a combination of properties that permit components of this "talented" material to meet rigid performance requirements.

Your rubber fabricator can design parts to build longer life and customer-pleasing performance into your automotive products. For full information, write Dept. 0909.



The nearest Dow Corning office is your number one source for information and technical service on silicones.



**Dow Corning CORPORATION**  
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.



# WHICH NEW GEAR PROCESS WILL YOU --- HELP CREATE

Every new gear production process "we" pioneered in the last 3 or 4 decades—and there have been many—had its origin as a problem faced by one or more people like yourself—men who recognized the existence of a problem and came to Michigan Tool for the answer.

Lets go back to 1925 when automobile transmissions were so noisy that drivers couldn't hear themselves think over 30 miles an hour. Sales complained to management, management to engineering, engineering to manufacturing. They finally came to us and we put our engineers and research laboratory to work. You know the answer—gear shaving and the equipment that made quiet gears practical and economical.

Since those days, "Gear Production Headquarters" has poured out a steady stream of answers to the problems of men like yourself—answers like Shear-Speed gear shaping to make the cutting of toothed parts possible at high speeds; Roto-Flo cold rolling of all kinds of splines, threads and grooves in seconds instead of minutes—stronger and better than if machined; optical sine-line gear checking for either laboratory or on-the-floor control; Gear-O-Mation devices for automatic parts handling in process; double enveloping gearing to carry bigger loads with smaller gears; Ultra-Speed hobbing; hard gear finishing; giant shavers and hobbors to turn out gears up to 20 feet in diameter to almost unbelievable precision toler-



## Michigan Tool Company

Circle 171 on Inquiry Card for more data





ances to make ship drives quiet to protect against submarines; grinding equipment to make even "spherical" gears.

To make some of the new processes work even better we created new tools, new coolants; new plastics for gear hones, indexing tables which divide a circle into 5 million parts accurate to a fraction of a second; even text and reference books to make gear designing easier.

You too must have a problem . . . large or small . . . about processes, machines or even tooling. Perhaps our experience has already provided the answer. If we don't have it, we'll go to work on it. Chances are we'll come up with it as we have so often before. It's worth trying and *your* Company will benefit.

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Plants in: Detroit, Traverse City and Manistee, Mich. and Windsor, Ontario.



**Gear Production:** The most complete line of equipment for gear production offered by any manufacturer.

Hobbers and Shapers for Job Lots  
High Production Hobbers  
Shear-Speed Gear Shapers  
Roto-Flo Cold Forming  
Shavers for gears of 1/2" to 200"  
Internal and External Form Grinders  
Sine-Line Gear and Tool Checkers  
Gear Chamfering Equipment  
Abrasive Gear Finishers  
Mitco Quality Gear Cutting Tools

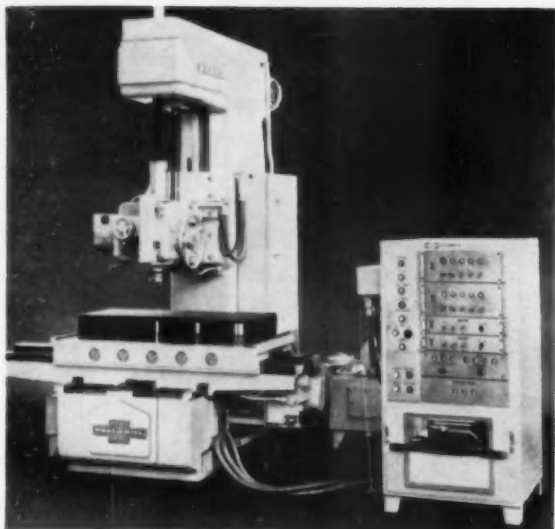
**Automation Equipment** (Gear-O-Mation Division): Engineering and manufacture of simple and practical equipment for automating a plant, a line, or a machine. Pre-engineered units for orienting, storage, loading, unloading, assembling, conveying, escapements, positioning, elevating, feeding.

**Form Grinding** (Gear Grinding Machines Division): "Detroit" fully automatic form grinders for both external and internal contours—involute, cycloidal, spherical, straight sided.

**Prototype Gearing** (Enterprise Division): Spur, helical, bevel gears and splines for prototypes and in developmental quantities. Also contour form grinding, internal and external.

#### OTHER MICHIGAN TOOL DIVISIONS INCLUDE:

Cone-Drive Gears Division (double-enveloping worm, gear, speed reducers, gear motors); Michigan-Lorenz Division (hobbers and shapers); Shear-Speed Chemical Products Division (coolants and cutting oils); Colonial Tool Co. of Canada Ltd. (cutting tools of all types).

**Close Tolerance Repeatability With Automated Machine**

Numerical control is featured on a new drilling machine, known as the Healdrill. It is designed to offer cost advantages, accuracy and flexibility for continuous production or short-run jobs. Accurate to plus or minus 0.001 in., this machine offers high part-to-part dimensional uniformity with repeatability of 0.0002 in.

This addition permits the machine to operate unattended while drilling a pattern of holes having the same diameter. The Acramatic control system also enables complete program shift (zero shift) in two axes over a full 20 by 48-in. area. The Heald Machine Co.

Circle 60 on postcard for more data

**Brazing Operations**

THROUGH the use of various sized work-coils and their respectively fitting adapters, brazing different sized brass sleeves to cold rolled steel can now be done on a single holding device. Only one minute is the maximum brazing time needed for even the largest sleeve-collar assembly with the model 2500, 25 kw generator, the manufacturer reports. Accomplished with two-turn pancake type work-coils and a clamping fixture used by Chrysler Airtemp Division, the work consists of a brass sleeve with an undercut at one end allowing it to take a performed silver alloy ring. The sleeve is press fitted into the collar for a perfect braze. Induction Heating Corp.

Circle 61 on postcard for more data

EQUIPPED with Cincinnati Milling's Acramatic analog type two-axis positioning control, this heavy-duty machine enables fully automatic direct programming of all machining functions: Table positioning, speeds, feed rates and tool change. A prime advantage of the single-spindle verti-

cal drilling unit is its spindle depth control feature. Limit switches, attached to six rotary scales, are actuated through a manual selector to predetermine tool down-feed position. Another feature, operated in conjunction with the spindle depth control, is an automatic Z axis (or quill) cycle.

# GIVE US A RING . . . .



### Brazing Torch

A UNIVERSAL pressure torch for use with natural gas where brazing or silver soldering is necessary, will operate on high, medium or low pressure, and produce an extremely hot, but clean flame. Named the 19 S, this unit offers three major advantages: lower fuel gas cost; the flame has a soaking heat effect; the finished work is clean and free of carbon deposits. The Harris Calorific Co.

Circle 62 on postcard for more data

### Belt Conveyor Idlers

AN extensive line of belt conveyor idlers has been expanded to include 60 new 35-deg deep trough idlers and 24 additions to the line of 45-deg idlers. Belt conveyors equipped with the new 35 and 45-deg idlers offer possibilities for economical handling of materials that formerly required the use of conventional 20-deg idlers, due to their greater capacity. Conveyors equipped with deep-trough idlers permit greater capacities than the same conveyors with 20-deg idlers, because of greater cross-sectional loads. Lower first costs of complete

### Automatic Chucking Machine for Precision Production

A new "miniaturized" single spindle chucking automatic, designated the O-AC, has been designed to bring the advantages of automatic production to producers of precision components, such as computer and guidance system hardware. The O-AC is capable of holding exceptionally close tolerances and producing fine finishes. It sets up and can be changed over from job to job quickly and easily, according to the company and has the flexibility to handle a wide range of work with relatively simple, low cost tooling. The Warner and Swasey Co.

Circle 63 on postcard for more data



conveyors are possible where cost of narrower belts with deep-trough idlers does not exceed cost of wider belts with 20-deg idlers. Cost of belt replacement can be less where initial

cost of narrower belts with deep-trough idlers is less than the cost of wider belts with 20-deg idlers. Link-Belt Co.

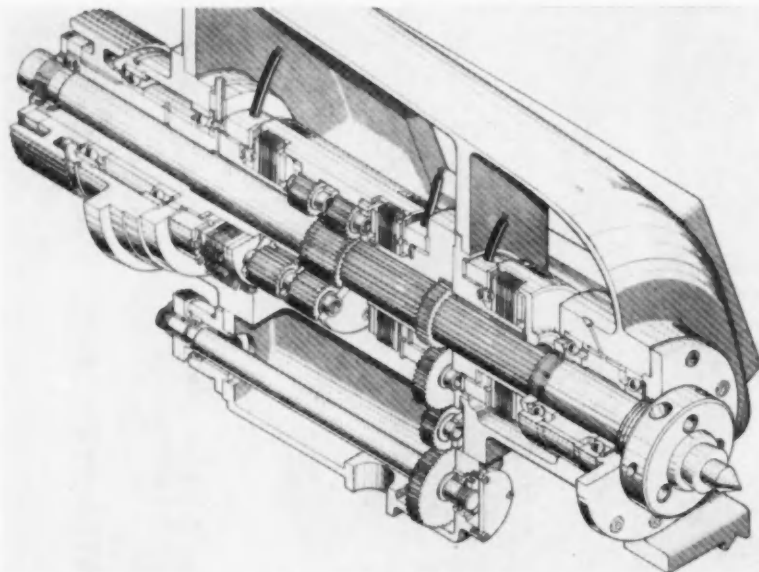
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... for your ring requirements

# McQUAY-NORRIS

Largest producer of small rings in the industry.....

### Precision Lathe Features New Coaxial Headstock



*New lathe has full motor horsepower through entire speed range to insure high torque at low speed for heavy cutting*

**M**ICRO-TURN is the designation given to a new lathe that is reported to be a new concept of high speed precision machining. This unit

has variable speeds from 43 to 3500 rpm with a 5 hp main drive. The coaxial headstock is designed around a single shaft surrounded by a float-

ing type ring and planetary gear arrangement. Inherent benefits of this construction are low inertia effect for quick acceleration and deceleration; prolonged clutch and brake life; simplified alignment further aided by a self-centering effect; and fewer revolving parts for greater smoothness and efficiency of power transmission. *Nebel Machine Tool Corp.*

Circle 65 on postcard for more data

### V Tread Design

**A** NEW V tread design in mold-on rubber wheel, combines easy rolling on thin tread wheel, resiliency and life of standard tread thickness. The iron core is cast with a V shaped rim, onto which rubber is molded. The V shape rim keeps the rubber from spreading and flattening, allowing outstanding rollability under heavy load. This shape also allows ample rubber at the center of the wheel for resiliency under shock loads. The wheel is available with sealed ball bearings, roller or taper bearings. *SI Handling Systems, Inc.*

Circle 66 on postcard for more data

**Let us show our metal . . . . .**





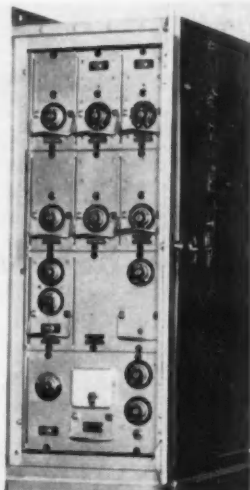
## Aluminum Furnace

A NEW line of double chamber dry hearth aluminum melting and holding furnaces consists of three furnace types designed for use in aluminum sand casting, die casting and permanent mold plants. All three furnaces are of single unit construction with individual melting and holding chambers. Either gas, oil or combination fuel-fired, the furnaces feature separate firing systems in each chamber to assure rapid melting in one chamber and correct holding temperature in the other. Direct firing on a sloping dry hearth in these furnaces makes possible fast melting and immediate run-off of molten metal into the holding bath. Better metal quality is achieved as moisture is driven off before the aluminum reaches the holding chamber. Oxides and other foreign materials present in gates, risers and scrap are deposited on the hearth during melting and can be removed with an occasional raking. These furnaces require a minimum amount of maintenance. Fast, easy cleaning is made possible through use of non-wetting refractory. Since aluminum is melted directly, there are no pots or crucibles to break, wear out

## Misfire Detector Helps Assure Perfect Welds

A misfire detector has been designed for resistance welding control equipment. Any misfire of the control's ignitron contactors, which operate on alternate half-cycles to switch current into the welding transformer primary, trips a relay and gives an indication to the operator.

Should one tube fail to fire the welder skips, and the second tube fires twice in succession. This may saturate the transformer and raise exciting current to a high value that could damage the other ignitron. The detector gives an instant indication of improper welds. General Electric Co.



Circle 67 on postcard for more data

or replace. Charging doors and dip-out wells are located at a convenient height. Brakedown burners are shut off during loading for increased safety and reduced heat radiation from the furnace opening. Dip-out wells are completely insulated to provide com-

fortable working conditions in the dip-out area. Depending on size and type, these furnaces are capable of melting from 250 to 2000 lbs of aluminum per hour with holding capacities to 2000 lbs. Hevi-Duty Electric Co. Circle 68 on postcard for more data

# McQUAY-NORRIS

## Piston & Sealing Rings

### EXCLUSIVE!... PHOSALLOY

McQuay-Norris electric furnace PHOSALLOY—a superior metal—gives rings unusual toughness, tension-retaining qualities, longer life.

### WHEN YOU NEED RINGS....

GIVE US A CALL. We offer the finest standards of quality in the industry. Our engineers—fully experienced in design, metallurgy and production—have helped others all along the line. They would like to help you.

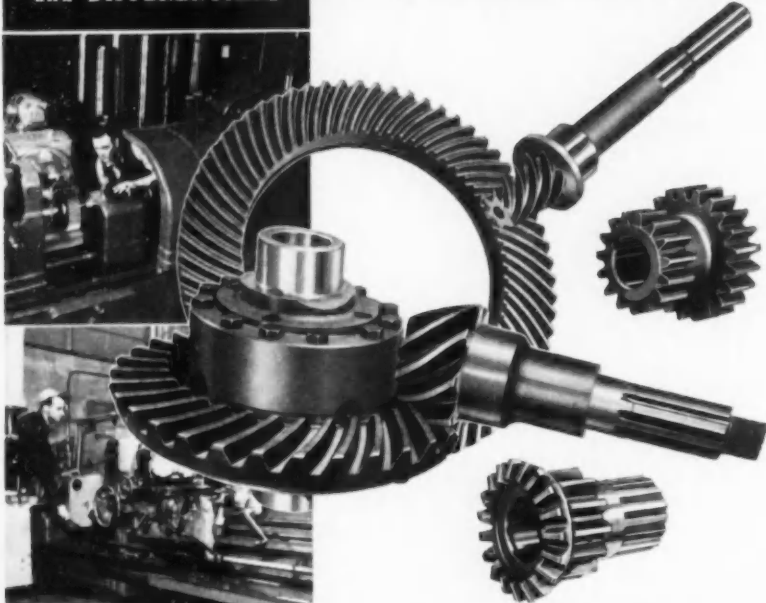
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ST. LOUIS • TORONTO



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and DIFFERENTIALS

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made to order  
by  
**FAIRFIELD**



## A Plus Value IN ANY PRODUCT!

Simple arithmetic explains why, TODAY, many of America's leading machine makers no longer undertake to solve the problems involved in production of gears, differentials, and specially designed gear parts. For them, FAIRFIELD IS THE ANSWER!

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Check with Fairfield NOW on your gear production schedules. As one of the nation's largest independent producers, Fairfield can usually give you quickest service available and handle any production requirement. *Become a Fairfield customer; it pays!* CALL OR WRITE.

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MANUFACTURING CO., INC.

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TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES  
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

## Off-Highway Trucks

(Continued from page 66)

of illustrations, troubleshooting and servicing charts provide a common denominator for all levels of training and communication.

**Evolution** — The past several years have witnessed a dramatic increase in the productivity, efficiency and reliability of off-highway trucks. At times, however, it appears that the proper perspective for these advances has not always been kept in sight.

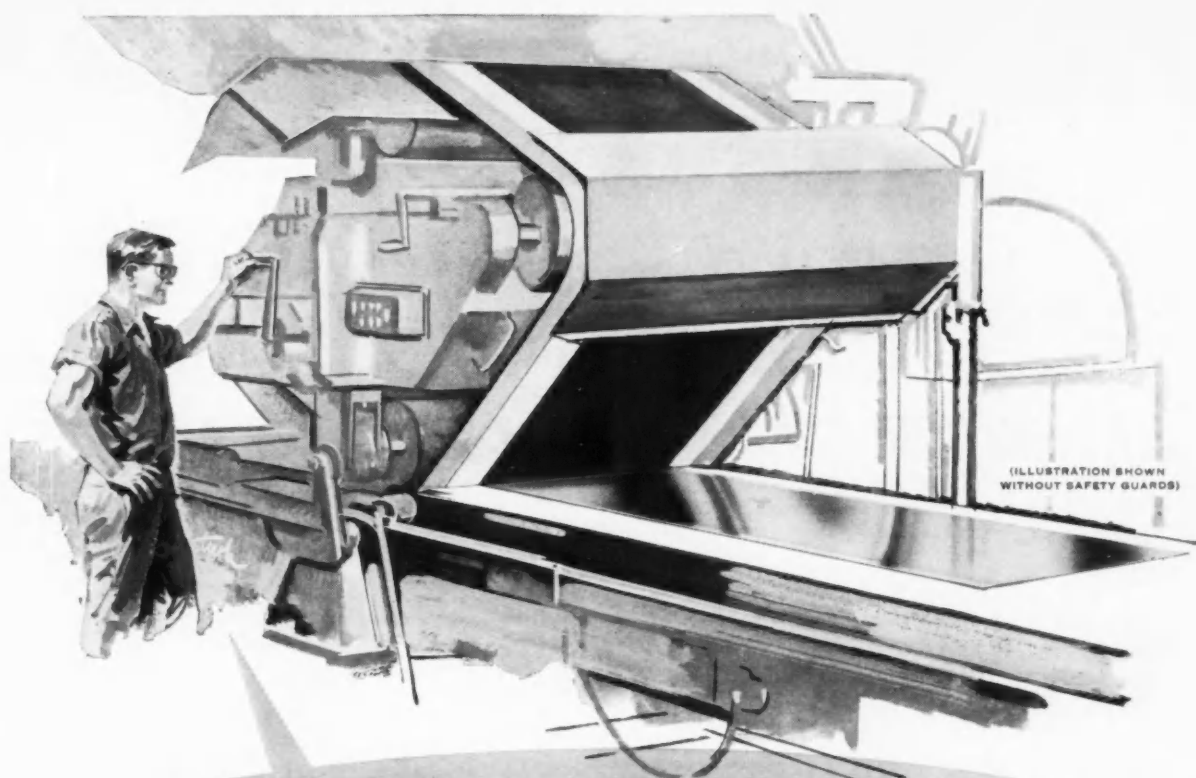
Manufacturers follow a carefully planned program of modifications and refinements to basic equipment designs rather than sacrifice the "predictables" to revolutionary developments and yearly model changes. To protect the buyer's investment and to make sure that his machine will remain a useful tool over a period of years to come, producers often spend years testing and evaluating equipment in a great number and variety of environments. Styling changes normally serve as a new envelope for proved advances in materials technology, human and product engineering and manufacturing methods.

A possible contribution to the reduction of vehicle weight will come from International Harvester's study of the use of corrugations in pan guards, canopies, side panels and floors. Recent developments in forming material to increase strength by Stanray Corp. have minimized die costs by standardizing on certain cross section dimensions of shapes, and handling the changes in length or width of pieces to be formed by making the dies in sections. Analysis of the use of corrugations has resulted in a body considerably lighter than the conventional design.

AiResearch Manufacturing has proposed a concept for a dual system gas turbine/Diesel engine. The turbine is used to supply starting power for the Diesel. At low temperature, it can also be utilized to preheat both the fuel and the engine. With the turbine declutched, the Diesel can be used over its lower power range in a normally aspirated fashion. Additional power demands can be met by using the turbine as a supercharger for the Diesel. ■

Gears and Differentials

Ask for interesting, illustrated bulletin.



## ASK YOUR POLISHER ABOUT THE DIFFERENCE IN STAINLESS SHEET

ALLEGHENY LUDLUM SHEET sets the standard for surface quality. Polishers will tell you—they handle all kinds and they should know. They want stainless sheet without flaws, a smooth surface ready to take further polishing to meet specs.

For stainless sheet delivered to the polisher with an irregular surface, or containing flaws, needs extra work that takes time and adds to cost—even causes loss of thickness.

That's why the polishers prefer to work with A-L stainless sheet. For A-L stainless sheet is always smooth . . . a surface without flaws . . . quality stainless, order after order. Your polishing department will also give an enthusiastic reception to stainless sheet from Allegheny Ludlum. Polishers think more of A-L stainless sheet—they will think more of you for ordering it for them. Remember, the pay-off is in the polishing.

For consistent temper, tolerances, and finish in flat rolled stainless products, call your Allegheny Ludlum salesman, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. AI-9.*



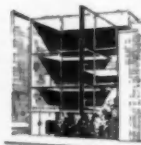
**ALLEGHENY LUDLUM**

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT



# AUTOMOTIVE INDUSTRIES

A CHILTON



PUBLICATION

## INDEX TO ADVERTISERS

This Advertisers' Index is published as a convenience and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert. When writing to advertisers please mention AUTOMOTIVE INDUSTRIES

To get catalogs, engineering data, or other additional information from advertisers, please circle appropriate number on post card at back of this issue. An inquiry card number appears at the bottom of each advertisement

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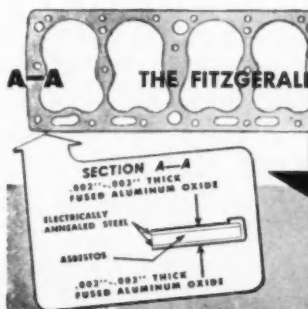
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of users know  
**FITZGERALD**  
Fused-Aluminum  
Steel and Asbestos  
**GASKETS**  
end costly  
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Specially designed,  
ruggedly built, to  
give a lasting,  
perfect seal in high  
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and water connections**

**THE FITZGERALD MANUFACTURING CO.**  
Torrington, Connecticut

**FITZGERALD**  
*Gaskets*  
SINCE 1906

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Container pivots 120° to  
facilitate loading-unloading.

## ALMCO Vibrasheen FINISHES FASTER!

**Constant vibratory motion . . .**  
that's the secret of faster deburr-  
ing and finishing you now get  
by using the new ALMCO *Vibra-  
sheen* Method!

This amazing metal finishing  
machine vibrates a full 5 cu. ft.  
load\* of parts and media . . .  
uses scrubbing action to remove  
burrs and finish parts in a fraction  
of the time required in ordinary  
barrel finishing operations.

The new *Vibrasheen* Method is

particularly suited for faster burr  
removal from parts, and finish-  
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crevices. Can be used for deburr-  
ing, descaling, cleaning, burnish-  
ing and surface refinement.

**For full story on *Vibrasheen*  
Method and on processing  
sample parts, write for the new  
ALMCO Album of New Products!**

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Gives full information  
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QUEEN PRODUCTS DIVISION  
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269 E. Main St.  
Albert Lea, Minnesota

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# PRODUCTION IMPROVEMENT PLANNING SERVICE

A New Service of the 1961 AI Products Guide and Buyers' Directory

Directions for use:  
Use this sheet for  
recording data for  
the Planning Service  
which will be  
available for  
qualified  
operations.

## A.I. Purchase Engineering and Production Improvement Planning Service

Below: Product Categories to check for your Improvement Program	Quality Control Analysis data Reported <small>... Report need for improvement need to Quality Control Dept.</small>	Additional data requested from reliable sources <small>... Check AI Products Guide from data from the sources</small>	Improvement potential rated from trial to test <small>... Provide the Major Factors of Improvement sought</small>	Improved product tested under shop conditions <small>... Check samples for desired performance on test fixture</small>	Engineering data compiled for check and comparison <small>... Compare performance data for old and new product items</small>	Purchase-Engineering data fully compiled for future use <small>... Prepare complete report for purchase-engineering</small>	Recommendations: <small>... Report dates and schedules for trial use of improved products &amp; equipment</small>
Abrasives							
Industrial Process Equipment							
Conveyors & Eqp.							
Dies							

### What the AI Production Improvement Planning Service Is:

Basically, it is a new working tool for Production, Engineering, Purchasing, and Management executives in the automotive manufacturing market. It is designed to make the job of purchase engineering easier for them. For the advertiser in the 1961 AI Products Guide and Buyers' Directory issue, it provides an unequalled opportunity for supplying technical information and sales follow-through to the automotive executives who specify or initiate purchases.

### How the Production Improvement Planning Service Works:

AUTOMOTIVE INDUSTRIES will bind the 22" by 28" worksheet illustrated here into the 1961 Products Guide and Buyers' Directory issue (issue of December 15, 1960). In addition, AI will supply the worksheet to the executive in charge of Engineering and Production in each of the 6,200 automotive manufacturing plants in the U.S. This worksheet is the first effort for the automotive industries to provide a standard step-by-step program for product evaluation and improvement. Advance research revealed the need and the validity of this tool, in which the following product categories are itemized:

Abrasives / Automation Equipment / Casting & Steel Processing Mtls. / Chemicals  
Conveyors & Equipment / Electrical Equipment / Electrical Materials / Fasteners  
& Equipment / Fixture Components / Furnaces & Heat Treating Equipment  
Gauges & Testing Equipment / Hand Tools / Hydraulic Equipment / Industrial  
Process Equipment / Lubrication Equipment / Mtls. & Processes for Tooling  
Machine Tools / Metals / Metal Cleaning & Finishing Equipment / Paint & Painting  
Equipment / Parts & Components / Petroleum Products / Powered Hand Tools  
Powered Ind. Trucks / Pneumatic Equipment / Process Controls / Rubber &  
Plastic Materials / Safety Equipment & Materials / Textile & Leather Mfg.  
Materials / Tools & Dies / Welding Equipment & Supplies

### How Advertisers Can Tie In With the Production Improvement Planning Service:

Advertisers in the 1961 AI Products Guide and Buyers' Directory issue will have the opportunity to indicate their product improvement factors, available technical literature and engineering services on a special 8½" by 11" Data Sheet. These Data Sheets, furnished by the advertiser, will be mailed by AI to the key man in each of the 6,200 automotive plants, along with the basic worksheet. Through this method, advertisers can have their product improvement story in front of the right people at the right time... in addition to their sales messages in the advertising pages of the AI 1961 Products Guide and Buyers' Directory issue.

### AI Plan of Action for Engineering and Production Executives:

1. Locate items that need improvement / 2. Analyze the need for improvement
3. List the factors of each problem / 4. Locate sources for improved products and services (use the Automotive Industries Products Guide issue for handy reference) / 5. Obtain the specific application data that you need / 6. Test and try the product proposed / 7. Compare actual improvement factors / 8. Prepare purchase-engineering data report / 9. Follow up purchase-engineering report with production change orders and specification sheets for engineering standards
10. Analyze results of improved operations and report to each department: Production, Engineering, Purchasing and Standards

This is the plan top executives in the automotive manufacturing market will be following this December. You can tie in to this evaluation process for the first time through Automotive Industries' 1961 Products Guide and Buyers' Directory, which features the new Production Improvement Planning Service.

**Issue Date: December 15, 1960**

For more information: Contact your nearest AI regional manager. Offices in Philadelphia, New York, Cleveland, Chicago, Detroit, Atlanta, Dallas, San Francisco and Los Angeles.

## AUTOMOTIVE INDUSTRIES

A CHILTON PUBLICATION

56th & Chestnut Streets • Philadelphia 39, Pa. • SHerwood 8-2000

Below:  
Product Categories  
to check for your  
Improvement Program

Powered Ind. Trucks							
Fasteners & Eqp.							
Furnaces & Heat Treating Equipment							

**Locate sources for products and information by using the December 15, 1960 Products Guide Edition of Automotive Industries for ready reference**

# Technical Literature for your own ENGINEERING LIBRARY

New Catalogues, Bulletins,  
Data Sheets and Reports

Advertisers' Products and Services Data;  
and more information on New Production  
Equipment and New Products described edi-  
torially in this issue

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By C. J. Kelly  
ASSISTANT EDITOR

### Gear Honing 1

Described and illustrated in the brochure are the honing principle and a new machine called the Red Ring model GHD gear honing machine. A four-way honing feature, crown honing possibilities and machine operating details are discussed. Specifications are given for both semi-automatic and fully automatic machines.

A comprehensive table listing production data for present industry gear tooth honing applications is given on the back page along with a discussion of honing considerations. *National Broach and Machine Co.*

### Diffusers 2

This 24-page catalog takes you briefly through the history and evolution of lighting and air distribution, from the kerosene lamp and pot bellied stove up to today's versatile combination light and air diffusers. Data for selecting and predicting performance, and drawings illustrating how the new combination light and air diffusers are installed and balanced, are included. *Barber-Colman Co. and Day-Brite Lighting, Inc.*

### Radiography Data 3

New equipment used in non-destructive testing operations is described in an illustrated bulletin. It contains a chart to show the typical exposure time for 1000 curies of cobalt 60, and discusses the advantages of this system over other types of testing, non-destructively. Components, operation, safety features and a list of technical specifications are also shown in this literature. *Radi-onics Inc.*

### Weld Lines 4

A four-page booklet describes and illustrates an automatic assembly machine that is capable of manufacturing up to 900 units per hour. *United Welders, Inc.*

### Maintenance Manual 5

A new maintenance manual will be available in September. The 24-page illustrated booklet, "63 practical ideas in easy truck maintenance and repair with Inland 4-way safety plate," is designed for use as a shop manual, providing how-to-do-it instructions as well as suggesting the pattern and gauge best suited to each application. *Inland Steel Co.*

FREE LITERATURE--USE THESE POSTCARDS

(Please turn page)

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Please send further information on items circled below.

9/15/60

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By C. J. Kelly  
ASSISTANT EDITOR

### Tool Catalog

Cutting tools of many different types are covered in a new 45-page publication. Among the tools listed are: plain milling cutters, light and heavy; helical milling cutters, side milling, half side, staggered tooth, interlocking; metal slitting saws, hollow ground, side chip and staggered tooth. *F & D Tool Co.*

### Tool Data

Prepared to assist process engineers, tool designers, foremen and machine operators in obtaining maximum accuracy and extended tool life, this eight-page brochure covers set-up procedures, speeds and feeds, recommended lubricants for various materials, and remedies for a wide range of metalworking problems. *Muskegon Tool Industries, Inc.*

### Motor "Idea Book"

A new 14-page electric motor "Idea Book" and condensed catalog is filled with useful data for designing, selecting and specifying special motor designs. Please request on company letterhead to: *Doerr Electric Corp., 100 N. Fourth Ave., Cedarburg, Wis.*

### Refractory Materials

This literature contains a description of newly developed single crystals designed to preserve the standard melting point of refractory metals. It shows charts to cover the preliminary data on properties and availability. *Linde Co., Div. of Union Carbide Corp.*

### Surface Plates

Technical answers to questions are contained in a 20 page brochure. It covers all areas of what is required of a surface and decisions to be faced when buying new equipment. *Rahn Granite Surface Plate Co.*

### Engineering Services

A broad range of design and engineering services, along with some unusual services to aid management and manufacturing, are detailed in a new 16-page brochure. Technical publication and graphic illustration services also are described. The brochure explains procedures for engaging M-E engineering services, and the ease of initiating or discontinuing projects at customer's discretion. *Modern Engineering Service Co.*

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## Socket Screw Data 12

In addition to explaining the many advantages of the new industry standards, this brochure contains complete dimensional data on both the "1960 Series" and the "1936 Series." This is so all users of socket cap screws can quickly ascertain differences when deciding whether to shift over to the new design immediately or at a later date. Separate thread length charts are also provided with the brochure. *Standard Screw Co.*

## Processing Equipment 13

A new two-color, 16-page, fully illustrated booklet describing the latest cost-cutting developments in automated processing equipment for handling steel, stainless, brass, and aluminum coils in manufacturing plants and warehouse service centers. Please write on company letterhead to: *Production Machinery Corp., P. O. Box 104, Mentor, Ohio.*

## Gun Driller 14

Illustrations, technical information and specifications are all included in a brochure and data sheet that covers a line of hole making devices which attaches to various types of turret lathes. *The Ward-Riddle Co.*

## Welder Bearings 15

Bulletin 6-023 describes and illustrates a line of current-collector type bearings with anti-friction mounted shaft. Line drawings, technical specifications and general information are included. *Taylor Winfield Corp.*

## High Tensile Steel 16

The special features of Yaloy E, a low alloy high tensile steel, are told in a new four-page brochure. Examples of use are given, as is a chart showing fabrication practice for cold forming of this material. *The Youngstown Sheet and Tube Co.*

## Rubber Gaskets 17

Rubber valve cover gaskets are described in a new publication that contains a listing of the many features offered by this line. It discusses the manufacturing and quality also. *Felt Products Mfg. Co.*

## Thermocouple Fittings 18

This new catalog fully illustrates and describes a complete line of thermocouple fittings, pressure sealing glands and thermocouple accessories.

Included are the Conax patented bare wire thermocouple glands that provide low mass, fast response and simple, positive method for sealing two or more bare wires from the full vacuum to 10,000 psi, at temperatures from -300 deg F to +1850 deg F. *The Conax Corp.*

## Production Tools 19

Holding tools, spindle extensions, tool control systems and other precision tooling are illustrated and described in a folder which is offered to the industry. It contains line drawings, exploded views and application data. *Seibert and Sons, Inc.*

## Power Cylinders 20

The center spread of this four-page bulletin covers the strokes, prices and dimensional data for an expanded line of air and hydraulic power cylinders which are designed for a wide range of industrial applications. The front page of the booklet lists 12 benefits provided by the miller "stock program." *Miller Fluid Power Div., Flick-Reedy Corp.*

## Control Devices 21

Designated catalog G-100, this four-page brochure contains illustrations which aid the detailed description of the systems and components available for the continuous monitoring of and indicating of minute changes in dimensions for control usages. *Measurement Control Devices, Schaeffler Engineering.*

## Valves and Cylinders 22

Standard non-rotating air or hydraulic cylinders, valves and accessories are illustrated and described in catalog 110C. Included are cutaway drawings, line drawings and all technical data that is important to designers. There are also specification charts to cover the various ranges of these units. *The S-P Mfg. Co.*

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### Shaped Wire

Catalog DH-1226-A is a 16-page publication which covers Page's facilities for providing wire of various analyses preshaped to a desired cross-section as a means to help the user reduce his production costs and improve the design of his product. It also contains helpful information on methods of calculating areas of common shapes; physical properties of steel wire; table of standard wire gauges; and hardness conversion tables. *Page Steel and Wire Div., American Chain and Cable Co., Inc.*

### Surface Plates

Four pages cover the features of industrial surface plates and illustrate the precision that goes into the manufacturing of the various size units. Charts are included to show the necessary specifications required in choosing a plate for a specific application. *The Herman Stone Co.*

### Industrial Furnaces

A six-page folder describes a line of furnaces and related equipment that is designed for carburizing, carbonitriding, carbon restoration, normalizing annealing and hardening operations up to 1850 deg F. It contains illustrations and specification information. *Sunbeam Equipment Corp.*

### Hydraulic Cylinders

Consisting of 16 pages, catalog 260 covers hydraulic cylinders ranging in bore sizes of 1½ to 12 in. and 17 mountings. It is designed to aid executives, engineers, designers and draftsmen in finding all pertinent information on this line quickly. Line drawings, with specification notations, and charts are included to show the necessary selection data. *The Sheffer Corp.*

### Drillheads

Thriftmaster catalog number 2 describes a variety of multiple spindle drillheads in 28 pages. Illustrations, line drawings and technical data are included, along with specification information. *The Kotula Co., Inc.*

### Operation Data

Perforating, blanking and slitting operations on all kinds of flexible material are covered in a new 20-page booklet. Prepared to serve as a working tool, this catalog discusses suggested applications, materials, how to specify and a host of patterns are illustrated in actual size with detailed specifications. *Perforating Industries.*

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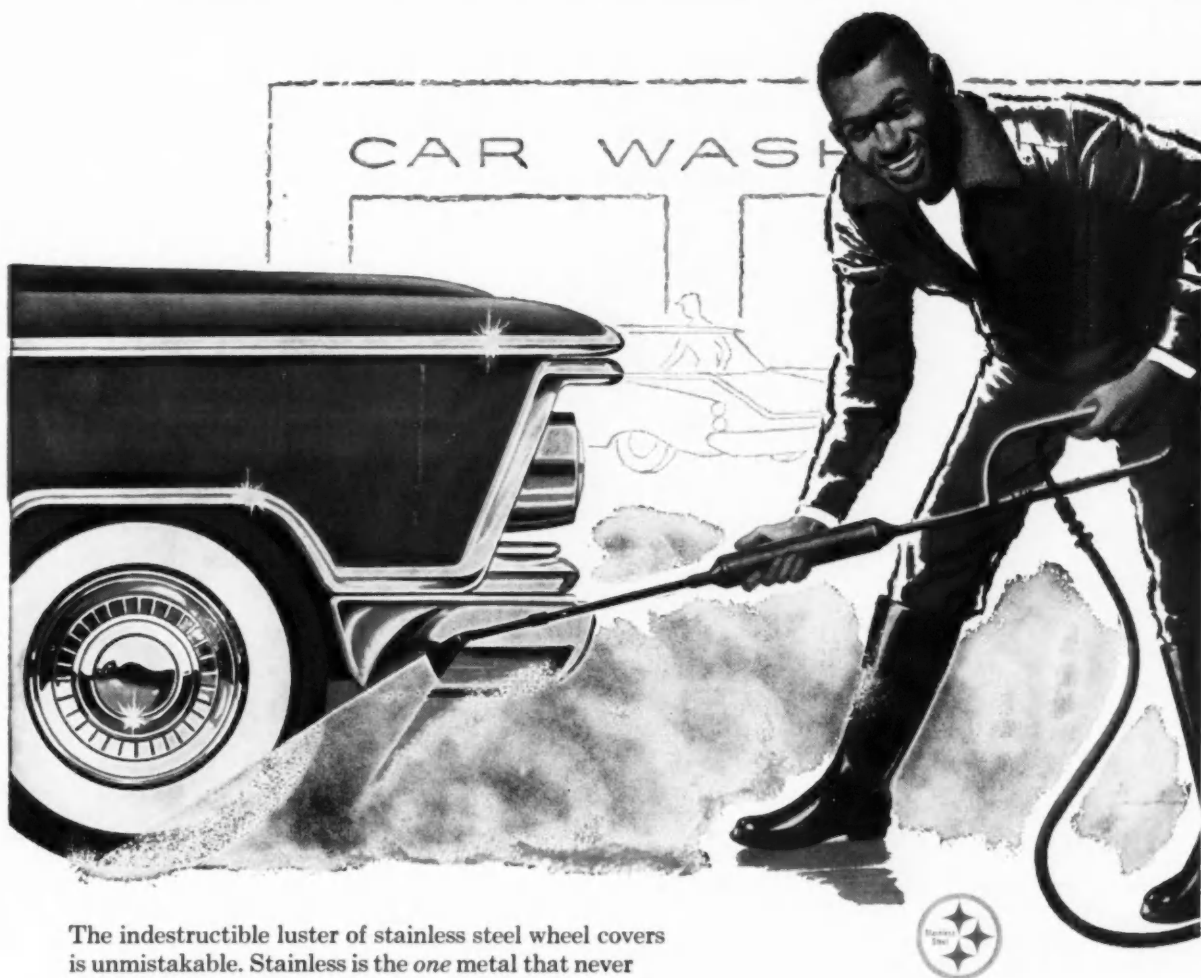
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